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PROJECT REPORT

Interagency Natural Resources and Environmental Analysis and Synthesis Center at Utah State University Logan, Utah

July, 1995

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**Interagency Natural Resources and Environmental
Analysis and Synthesis Center at Logan
and the
Bureau of Land Management's**

**Landscape Ecology: Modeling and Analysis Center
(LEMAC)**

Executive Summary

- The Bureau of Land Management's Landscape Ecology: Modeling and Analysis Center (LEMAC) is co-located with other agency science units in a unique multi-disciplinary, multi-agency environment provided by Utah State University.
- The purpose of LEMAC is to work, in an integrated and collaborative environment, with academia, other agencies, and organizations to develop scientific and technological tools that have application for on-the-ground management of ecosystems and landscapes and the total human environment.
- The MOU created the Interagency Natural Resources and Environmental Analysis and Synthesis Center at Logan, Utah, incorporates LEMAC and other agency science units to establish a unique framework for enhanced relationships, cooperation, collaboration and participation among public and private cooperators.
- The Interagency Center fosters an interdisciplinary, multi-agency, and organizational approach to landscape and ecosystem modeling, monitoring, and analysis. It further provides basic and applied research and education support to land management, environmental, and natural resource organization.
- The cooperators will work together through the Center to promote interaction between agencies and disciplines, provide a central focus for development of practical applications for landscapes and systems-integrated ecosystem management, that carries into training and academic research. This is a unique approach that covers a multitude of agencies, organizations and scientific disciplines and has not been implemented at this scope and scale anywhere else.
- The MOU creating the Interagency Center at USU links all ongoing activities, provides a structure to cooperate and collaborate without unnecessary red tape. It provides a means to, and facilitates, integration of agency and collaborator efforts in mutually

beneficial work, allowing them to combine efforts and resources and extend the capabilities of each agency by joining forces.

- Provide an information highway where all public land managers, users, and interested publics may be better informed about their actions which may affect the ecosystem, landscape, and total human environment.

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OVERVIEW

In September, 1993, the Bureau of Land Management established a Landscape Ecology: Modeling and Analysis Center at Utah State University, College of Natural Resources. Utah State University was selected after a review of other potential university locations to take advantage of unique and existing Federal, State, and academia partnerships and collaboration. The purpose of this Center is to work in an integrated and collaborative environment with academia, other agencies and organizations to develop scientific and modern technological tools that have application for on-the-ground management of ecosystems and landscapes and total human environment.

LEMAC fills a gap in the Bureau's network of support to field offices. In response to on-the-ground needs, LEMAC develops and prototypes applications and methodologies for ecosystem and landscape management, provides liaison and technology transfer services, facilitates and coordinates inter and intra agency efforts, and provides technical assistance to field offices. Many other services and benefits are available through LEMAC as a result of the collaboration with the faculty at Utah State University, their colleagues, and other agencies working with Utah State University.

The Interagency Natural Resources and Environmental Analysis and Synthesis Center at Logan, Utah is a logical outgrowth of the informal collaborative efforts of many agencies and Utah State University, College of Natural Resources. Over 3 million dollars are invested annually by Federal Agencies through various research and cooperative units located at USU. Few of these efforts have been coordinated with other agencies, and opportunities to share resources and extend the capability of limited funds are foregone. The Memorandum of Understanding that formalizes this Center, establishes a unique framework for enhanced relationships, cooperation, and participation among public and private cooperators. The Center fosters an interdisciplinary, multi-agency, and organizational approach to landscape and ecosystem modeling, monitoring, and analysis. It further provides basic and applied research and education support to land management, environmental, and natural resource organizations. The cooperators propose to work together through the Center to promote interaction between agencies and disciplines, providing a central focus for development of practical applications for landscape-level, system-integrated ecosystem management that carries into training and academic research. This is a unique approach, which covers a multitude of agencies, organizations and scientific disciplines and has not been implemented at this scope and scale anywhere else.

The Memorandum of Understanding continues policies and administrative procedures for working relationships between parties of the agreement in support of common objectives and interests, building a consortium of Federal programs, particularly in the western U.S., whose

aim is to evaluate and manage ecological and environmental resources through a broad approach, integrating ecological, earth sciences, socio-economic, cultural, political, and management systems at the landscape and local levels. It builds on the general principles of cooperation, collaboration, coordination, and communication between all disciplines, agencies, and publics.

The MOU links all ongoing activities, provides a structure to cooperate and collaborate without unnecessary red tape. It provides a means to, and facilitates, integration of agency and collaborator efforts in mutually beneficial work, allowing them to combine efforts and resources and extend the capabilities of each agency by joining forces.

Major goals and activities of the Interagency Natural Resources and Environmental Analysis and Synthesis Center at Utah State University include:

- Develop and prototype systems and protocols for monitoring and analysis of natural and cultural resources, and the total human environment, using a combination of modern technology and traditional sciences, and provide linkages and coordination between agencies and organizations.
- Develop an integrated data collection system that can support and sustain the natural resources management and monitoring needs of all agencies and organizations for landscape-level ecosystems and interrelated socio-economic and political systems.
- Provide training and educational opportunities to agencies and the public in the techniques of environmental mapping and the evaluation and display of cumulative effects associated with proposed management alternatives on an ecosystem, landscape, and broad human community basis.
- Provide research to support public and private land management, resource, and environmental organizations in ecosystem and landscape management.
- Provide a focal point for technology and data transfer between agencies, organizations, and institutions.
- Provide a synthesis of extant data for landscape and ecosystem management to include social, behavioral, economic, and disturbance aspects.
- Bring together groups of researchers, managers, and publics from ecological sub-disciplines, other biologists, and allied physical, social, and economic scientists to produce integrative and comprehensive analyses of ecological and ecosystem knowledge.
- Provide facilities and support for individual scientists to formulate, test and monitor models, comparative analyses and synthesis publications.
- Promote use of extant data sets from diverse studies in ecology and other disciplines and ensuring that relevant information and data are readily available in a format that is useful and beneficial to governmental agencies and private organizations at all levels from community to state to national levels.

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- Facilitate the development of new analytical tools and models for on-the-ground managers.
- Organize and prototype systems that organize extant ecological, soci-economic, cultural and anthropological and other interrelated data in ways that make them available to a larger community of potential users.
- Provide analytical resources not normally available to individual or groups of researchers and practitioners.

Part 1

Native Plant Conservation Initiative

Native Plant Conservation Initiative

U.S. Geological Survey

Biological Resources Division

Native Plant Conservation Initiative

System of Land Management

Planning and Policy Division

U.S. Forest Service

U.S. Army Corps of Engineers

Project Location

Native Plant Conservation Initiative, Arizona and Texas

Investigators

David R. Anderson

Paul R. Anderson

William R. Anderson

David R. Anderson

Allen R. Anderson

Tom R. Anderson

Objective

The purpose of the project is to develop and improve the management of the Department of Defense's Native Plant Conservation Initiative (NPCI) by developing a comprehensive plan for the collection, storage, retrieval, sharing, and analysis of information on natural and cultural resources in the NPCI.

Phase I. The purpose of Phase I is to develop the necessary infrastructure of hardware and software systems and personnel to enable the NPCI to develop a comprehensive plan for the collection, storage, retrieval, sharing, and analysis of information on natural and cultural resources in the NPCI. Furthermore, Phase I will develop the NPCI's data base and will develop the necessary hardware and software systems and personnel to enable the NPCI to develop a comprehensive plan for the collection, storage, retrieval, sharing, and analysis of information on natural and cultural resources in the NPCI.

CHAPTER

1

The first part of the book is devoted to a general introduction to the subject of the book. It is divided into two main parts: the first part is devoted to a general introduction to the subject of the book, and the second part is devoted to a more detailed discussion of the various aspects of the subject.

Mojave Desert Ecosystem Initiative (Mojave Ecosystem Inventory and Data Bank Cooperative)

Collaborating Agency(ies): National Training Center, Fort Irwin, CA
Naval Air Weapons Station, China Lake
Edwards Air Force
Marine Corps Air Ground Combat Center, Twenty Nine
Palms
Marine Corps Logistics Base
Nellis Air Force Base
U.S. Geological Survey
National Biological Service
National Parks Service
Bureau of Land Management
Fish and Wildlife Service
U.S. Bureau of Mines
U.S. Army Topographical Engineering Center

Project Location: Mojave Desert in California, Nevada, Arizona and Utah

Investigator: Steve Ahmann
Paul Kip Otis-Diehl
William Kennedy
Joseph Chapman
Allan Falconer
Ann Kinsinger

Objective:

To protect the natural and cultural resources and supporting the mission of the Department of Defense in the Mojave Desert Ecosystem by developing a cooperative data base to facilitate the collection, storage, transfer, sharing and analysis of information on natural and cultural resources in the Mojave Desert.

Phase I. The purpose of Phase I is to establish the necessary networks of hardware and software networks and protocols to enable the Mojave Ecosystem Initiative (MDEI) participants to gain access to the Clearing House Network through the Internet. Furthermore, Phase I will develop the MDEI's Home Page and interface to the public and will incorporate existing spatial data for public use.

BRAT 1998: The 1998 International Conference on Computational Linguistics and the 1998 Conference on Natural Language Processing

BRAT 1998 was held at the University of California, San Diego, from July 13-15, 1998. The conference was organized by the Center for Language Acquisition, the Center for Natural Language Processing, and the Center for Computational Linguistics. The conference was a joint effort of the University of California, San Diego, and the University of Texas at Austin.

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Phase II. During Phase II, Utah State University will conduct a review of biological, physical, and cultural resources data that has been developed by the DOD, DOI, other federal agencies, universities, and other potential sources. Data shall be cataloged and a list provided in written and electronic format. All spatial data (i.e. GIS) shall have metadata developed according to standards developed by the FDGC and TSDS.

Phase III. Following completing of Phases I and II, the data validation and digitization Phase will begin. This Phase is intended to finalize prioritization of data identified during Phase II, and to enter specified data into electronic format. Additionally, data gaps will be identified.

Phase IV. Utah State University will eliminate data gaps which may include the services of entities or agencies best able to provide requisite services in cooperation with the LMOG.

Progress to Date:

Will begin August, 1995.

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Phase II. During Phase II, the data generated will consist of a series of biological observations and physical measurements that are being developed by the ERM, and which will be used to develop a model of the system. The data will be analyzed and a model developed to describe the system. The model will be used to predict the behavior of the system under various conditions.

Phase III. Following completion of Phase II, the data generated will be used to develop a model of the system. The model will be used to predict the behavior of the system under various conditions. The model will be used to predict the behavior of the system under various conditions.

Phase IV. The data generated will be used to develop a model of the system. The model will be used to predict the behavior of the system under various conditions. The model will be used to predict the behavior of the system under various conditions.

Progress to Date

7/21/82

The Utah Natural Resources Coordinating Council

Collaborating Agency(ies): Utah Department of Natural Resources

Project Location: Salt Lake City, Utah

Investigator: Ted Stewart

Objective:

The Utah Natural Resources Coordinating Council has been established to provide a forum for natural resource leaders from public agencies within the state of Utah to meet, network, and explore opportunities for cooperation and coordination of our various stewardship responsibilities and activities.

Membership is open to a single representative from any public agency in the state of Utah that has either a natural resource mission of significant interaction with natural resources within the state. An executive committee has been formed to plan the monthly meetings of the council.

The council has recommended adoption of the following objectives:

- 1) Share information
- 2) Enhance intergovernmental cooperation
- 3) Facilitate discussion of conflicts and challenges
- 4) Recognize successes
- 5) Minimize duplication of efforts and expenditures
- 6) Establish mechanism for data transfer
- 7) Pool resources to accomplish common objectives

The Utah Natural Resources Coordinating Council is chaired by the Executive Director of the Department of Natural Resources. The council may appoint and oversee inter-agency task teams to consider specific issues and problems and to make recommendation to the council. For more information, call Kathleen Clarke, Deputy Director of Natural Resources at (801) 538-7200.

The United Nations Conference on Environment and Development

United Nations Conference on Environment and Development

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United Nations Conference on Environment and Development

United Nations Conference on Environment and Development

The United Nations Conference on Environment and Development (UNCED) was held in Rio de Janeiro, Brazil, from June 3 to 14, 1992. It was the first major international conference on environment and development since the 1972 Stockholm Conference on Human Environment. The conference was organized by the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP).

The conference was a landmark event in the history of international environmental law and policy. It resulted in the adoption of the Rio Declaration on Environment and Development, the United Nations Framework Convention on Climate Change (UNFCCC), the United Nations Convention on Biological Diversity (UNCBD), and the United Nations Convention to Combat Desertification (UNCCD).

The conference was a landmark event in the history of international environmental law and policy.

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United Nations Conference on Environment and Development

Seed dispersal by domestic livestock: Application for rangeland revegetation

Collaborating Agency(ies): State, USAID

Project Location: Green Canyon Ecology Research Station, Logan

Project Duration: July 1992 - June 1996

Investigator: Christopher A. Call

- Objectives:**
- a) to examine the effects of different periods of exposure to in vitro and in vivo digestion processes on the viability and germinability of seeds of a variety of grass, forb, and shrub species.
 - b) to determine if an in vitro seed screening technique is a good predictor of seed fate following passage through the ruminant digestive tract.
 - c) to investigate the influence of dung microenvironmental factors on the germination and establishment of selected range plant species.

Progress to Date: Seeds of 13 species (grass, forb, and shrub) have been evaluated for survival after exposure to in vitro digestion and after passage through cattle, sheep dung containing passed seeds of crested wheatgrass have been placed on different substrates (annual and perennial vegetation, bare ground) at different planting times. Crested wheatgrass germination and establishment have been related to substrate suppression and dung moisture, temperature, and nutrient dynamics.

Future Plans: Small-scale, preliminary experiments will be followed by larger scale experiments that simulate actual management conditions in rangeland environments. Seeds of desirable species will be fed to large numbers of livestock in large pastures. Dung will be monitored for germination and establishment. Plants established in dung will be evaluated for seed production and dispersal to surrounding areas.

Knapweed management at the Yakima Training Center

Collaborating Agency(ies): USA-CERL

Project Location: Yakima Training Center, Yakima, Washington

Project Duration: September 1993 - October 1995

Investigator: Christopher A. Call

- Objectives:**
- a) To determine the ecological aptitude of diffuse knapweed.
 - b) To develop a remote sensing/GIS inventory system for diffuse knapweed.
 - c) To develop a predictive model for diffuse knapweed invasion based upon its ecological amplitude and the disturbance regime caused by military training vehicles.

Progress to Date: Diffuse knapweed density, stature, and reproductive capability data have been collected at 98 plots that represent ranges in elevation, temperature, precipitation, soils, slope, aspect, and vegetation type in a large watershed at the Yakima Training Center. A diffuse knapweed inventory is being developed from satellite images, color infrared aerial photos, and ground surveys.

Future Plans: Classification and regression analyses will be used to compare site environmental factors with knapweed attributes and determine its ecological amplitude. Supervised classifications of remotely sensed images will be used to create a map of knapweed invasion sites.

Summary of Management of the Vietnam Training Center

Submitted September 1967

Project Director: [Name]

Project Number: [Number]

Project Title: [Title]

1. To determine the extent of the problem

2. To develop a plan to solve the problem

3. To develop a detailed plan of action and to implement it

4. To develop a detailed plan of action and to implement it

5. To develop a detailed plan of action and to implement it

Postfire restoration for ecosystem management at arid installations

Collaborating Agency(ies): Department of Defense

Project Location:

Project Duration:

Investigator: Eugene W. Schupp

-
-
- Objectives:**
- a) Screen native grass species for potential use in revegetation of burned areas at Dugway Proving Grounds.
 - b) Collect preliminary data on the ability of bottlebrush squirreltail to compete with cheatgrass.

Progress to Date:

Future Plans:

EXHIBIT

7-10-77

Memorandum for the President, Vice President, and Members of the Board of Directors

Subject: [Illegible]

Reference: [Illegible]

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Some responses of soil microphytic crusts to livestock trampling

Collaborating Agency(ies): State, NPS

Project Location: Capitol Reef National Park

Project Duration: July 1989 - June 1994

Investigators: Neil E. West and James P. Dobrowolski

Objectives:

- a) find the thresholds for and amounts of sediment moved under artificial wind and water erosion after season long and winter only grazing and complete removal of the crusts.
- b) monitor soil moisture, soil temperature, nitrogen mineralization and vascular plant flowering, seed production and total plant moisture stress in the treatments and untreated controls.

Progress to Date: Complete removal of microphytic crust at one site did lead to accelerated wind and water erosion, but not saturated hydraulic conductivity. What partial removal of crusts at other sites would do requires further investigation.

Future Plans: An attempt to obtain funding for further work was unsuccessful. We thus had no means to continue this line of research.

From the results of the above analysis it is concluded that the

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Cumulative watershed effects: An empirical evaluation of nutrient concentration response to watershed management

Collaborating Agency(ies): USFS Pacific Southwest Forest and Range Experiment
Station, Region 5

Project Location:

Project Duration:

Investigators: James P. Dobrowolski and Charles P. Hawkins

-
-
- Objectives:**
- a) If cumulative effects influence nutrient loading, are these nutrients bioavailable and consequently effecting a response by stream biota?
 - b) Can we differentiate between variability in nutrient concentration produced by dissimilar geological or anthropogenic inputs?
 - c) Does a certain management activity and/or level of impact result in the response of a particular suite of nutrients?

Progress to Date:

Future Plans:

Conducting a watershed effect: An impact evaluation of natural environment response to watershed management

Collaborative Research
1000 Pacific Avenue, Suite 1000
Seattle, WA 98101

Project Location

Project Title

Project Status

Project Manager: Dr. John A. Hargrove

Project Description: This project is a collaborative effort between the University of Washington and the Pacific Northwest Laboratory to evaluate the impact of watershed management on the natural environment.

Objectives: The project has three main objectives: 1) to develop a watershed management plan for the Pacific Northwest; 2) to evaluate the impact of the plan on the natural environment; 3) to develop a monitoring system to track the progress of the plan.

Methodology: The project will use a combination of qualitative and quantitative methods to evaluate the impact of the watershed management plan. Qualitative methods include interviews with stakeholders and focus groups. Quantitative methods include data analysis of water quality and land use data.

Results: The project has found that the watershed management plan has had a positive impact on the natural environment. Water quality has improved, and land use has become more sustainable.

Project Status

Project Status

Reducing damage to riparian habitats by cattle through social learning

Collaborating Agency(ies): CSRS/State

Project Location: Fairfield, Idaho

Project Duration: July 1989 - June 1995

Investigators: Frederick D. Provenza and Roger E. Banner

- Objectives:**
- a) Identify habitat use patterns of individual cow-calf pairs.
 - b) Evaluate the extent to which habitat use preference is transmitted to offspring.
 - c) Determine the role learning plays in transmitting habitat use preference from mother to offspring.

Progress to Date: On mountainous summer ranges, cows have distinctly different home ranges to which they return annually. A calf shows a strong propensity as an adult to return to the home ranges of its mother. Thus, experiences early in life affect habitat selection by adults, and calves are trained by their mothers to use specific habitats. Excessive-use of riparian areas can be mitigated by changing behavior of cows and calves. Selectively culling cows that over-use riparian areas and retaining calves whose mothers use upland areas can result in cattle herds that do not over-utilize riparian areas. In addition, herding is effective in keeping cows out of riparian areas and in training their calves to use other areas. To change behavior of adults, herding must be done on a daily basis initially. Developing alternative water sources away from riparian areas enhances efforts to change cattle behavior.

Future Plans: The project ends on June 30, 1995. We have prepared manuscripts for scientific journals, and we are preparing articles for the popular press. We will continue efforts to disseminate this information through shortcourses and other extensions activities. We are also involved in cooperative projects in Nevada and Idaho to use this information to manage riparian areas.

Revising the National Highway Traffic Safety Administration's (NHTSA) Federal Motor Vehicle Safety Standards (FMVSS) for Child Seats

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Managing leafy spurge with diet-trained sheep and goats

Collaborating Agency(ies): CSRS Rangelands Research Grant

Project Location: U.S. Sheep Experiment Station, Idaho

Project Duration: October 1990 - September 1995

Investigators: John W. Walker and Neil E. West

- Objectives:**
- a) determine relative preference for leafy spurge by sheep and goats
 - b) determine the effect of early experience grazing leafy spurge by mother offspring pairs on subsequent relative preference for spurge
 - c) determine the effect of defoliating leafy spurge at different intensities and phenological stages on production and reproduction

Progress to Date: Goats utilize leafy spurge more readily than sheep, however, sheep can be trained to eat more spurge. Both animals can utilize enough spurge to slow down trends toward dominance. Multiple defoliations are needed at high percentages (>40%) over the plants' growing season to be effective.

Future Plans: This project has been completed. All that remains are getting the results out to potential users.

Memorandum for the President and Vice President

1. The President and Vice President are requested to consider the following matters for their consideration and approval.

2. The President and Vice President are requested to consider the following matters for their consideration and approval.

3. The President and Vice President are requested to consider the following matters for their consideration and approval.

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Digestive physiology and foraging behavior of bison from Antelope Island, Great Salt Lake

Collaborating Agency(ies): Utah Division of Wildlife Resources,
Agric. Experiment Station / Mineral Leasing

Project Location: Logan, Utah

Project Duration:

Investigator: Philip J. Urness

Objectives:

- a) Determine relative forage processing efficiencies of bison vs. domestic cattle on low-quality forages.
- b) Compare N cycling efficiency of bison and cattle.

Progress to Date: Project terminated. Two manuscripts submitted and rejected by Journal of Animal Science. These are being reformatting for resubmission. One manuscript published in Journal of Range Management.

Future Plans:

Foraging interactions between elk and cattle on early spring range

Collaborating Agency(ies): Utah Division of Wildlife Resources / Pittman Robertson

Project Location: Fishlake Plateau and Uinta Mountains

Project Duration:

Investigator: Philip J. Urness

Objectives: To assess impacts of early spring use by elk on range readiness and forage production available later for cattle in summer.

Progress to Date: Terminated project. A Master's theses, completed and defended; manuscripts in preparation. A second Master's student has defended, but has not completed the program.

Future Plans:

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Page 1

Following instructions, fill in the blank and circle on empty space.

1. The first of the following is the name of the person who is the author of the book.

2. The second of the following is the name of the person who is the author of the book.

3. The third of the following is the name of the person who is the author of the book.

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**The process and mechanisms of plant competition
in the Great Basin sagebrush-dominated ecosystem
and spatial and temporal heterogeneity
of resource availability in the sagebrush-steppe**

Collaborating Agency(ies): NSF

Project Location:

Project Duration:

Investigator: Martyn M. Caldwell

-
- Objectives:**
- a) to assess the occurrence, magnitude and significance of water leakage from roots and water transfer between plants
 - b) to assess plant exploitation of micropatches rich in nutrients
 - c) to perform an experimental sensitivity analysis for genetic characteristics of roots associated with competitive ability.
 - d) to evaluate root competition effects upon fitness components such as seed output, seedling establishment and seedling survival.
 - e) to test predictions from the detailed studies above in landscape situations across the Great Basin.

Progress to Date:

Future Plans:

The purpose and objectives of this contract
to the State of New York and the
and the State of New York
of the State of New York

Contract No. 10-202

State of New York

County of New York

City of New York

Whereas the State of New York is desirous of

1. To provide a contract for the purchase of

2. To provide a contract for the purchase of

3. To provide a contract for the purchase of

4. To provide a contract for the purchase of

5. To provide a contract for the purchase of

Witness my hand and seal this 10th day of

10-202

Uptake of technology and management innovations within Utah pastoral production systems under induced change

Collaborating Agency(ies): McIntire Stennis

Project Location: Various Counties in Utah

Project Duration: July 1992 - June 1997

Investigator: D. Layne Coppock, G. Allen Rasmussen

- Objectives:**
- a) Identify systems and subsystems for Utah pastoral production on the basis of homogeneity in terms of access to factors of production, production objective, socioeconomic features, and ecological zone;
 - b) Identify groupings of technology and management innovations on the basis of homogeneity in terms of production/management objectives, extension effort, economic cost/benefit relations, risk, and ease of implementation;
 - c) Predict variation in rates of adoption of technology and management innovations for homogeneous target populations of beef cattle producers; and
 - d) Provide recommendations as to how research, extension, and/or policy formulation could have greater effects on accelerating uptake of technology/management innovations in the promotion of sustainable patterns of land use.

Progress to Date: One master's student, Alan Birkenfeld, has completed his M.S. on this project. The thesis is published and two papers are in preparation.

Future Plans: A new M.S. student has been recruited to take over this field work. Her name is Regina Peterson, and she will arrive in July. A sustainable agriculture (SARE) grant has been obtained to augment funding.

Impact of Technology and Management Innovations on the U.S. Productive Sector under Induced Change

Author: [Name]
Title: [Title]
Date: [Date]
Institution: [Institution]

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Identifying issues, concerns, and opportunities of Utah's privately owned rangelands under ecosystem management

Collaborating Agency(ies): State / Mineral Lease

Project Location: San Juan, Uintah, Duchesne, Sevier, Piute, and Beaver Counties (Utah)

Project Duration: July 1994 - September 1995

Investigators: Mark W. Brunson and G. Allen Rasmussen

Objectives:

- 1) Develop information and education strategies to help rangeland stakeholders on private lands adjust to the effects of ecosystem management strategies implemented on adjacent public lands.
- 2) Describe landowners' knowledge, beliefs and concerns about ecosystem management, and their information needs concerning the practice of ecosystem management and associated programs.
- 3) Assess rancher attitudes toward different mechanisms of cross-boundary cooperation in ecosystem management programs, with emphasis on means of reducing public/private conflicts.

Progress to Date: Initial evaluations have been completed and data are being analyzed for Objectives 2 and 3.

Future Plans: Educational strategies will be developed once the data has been analyzed. Preliminary results will be presented at the Fifth International Rangeland Congress in July 1995.

Statement of Work and Objectives of the Project

Project Title	Project Number	Project Status
Project Title	Project Number	Project Status
Project Title	Project Number	Project Status

Project Title

Project Title

Project Title

Project Title

Project Title

Project Title

Postfire restoration for ecosystem management at arid installations

Project Location: U.S. Army Dugway Proving Grounds

Project Duration: 28 Sept. 1994 - 27 Sept. 1995 with possible extension

Investigator: Eugene W. Schupp

Objectives:

- a) Screen native grass species for potential use in revegetation of burned areas at Dugway Proving Grounds.
- b) Collect preliminary data on the ability of bottlebrush squirreltail to compete with cheatgrass.

Progress to Date: All experimental seedings have been completed and two censuses of seedling emergence and early survival have been completed.

Future Plans: Will continue to monitor survival and growth of emerged seedlings. Depending on funding, new experiments on native species establishment and competition with cheatgrass may be initiated.

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6. The following information is for your information only and should not be used for any other purpose.

7. The following information is for your information only and should not be used for any other purpose.

Aquatic monitoring task order #7

Collaborating Agency(ies): Bureau of Land Management

Project Location: Utah State University, College of Natural Resources

Project Duration: October 1993 - September 1995

Investigators: Dean Joseph A. Chapman
Raymond D. Dueser
Mark Vinson (BLM Cooperator)

Technicians: Ann Kendall Jeffrey Finch
Matt Tagg Brad Higginson
Dan Zamecnik Larry Hill
Dan Barnes Craig Kendall
Happy Dinton Alys Bennett
Scott Hawxhurst (Supervisor)

Goals and Objectives:

The primary goal of this project is to serve as a water quality monitoring sample survey center for the intermountain west. This macroinvertebrate taxonomy laboratory serves the needs of both the USDI Bureau of Land Management and USDA Forest Service to ensure water quality in western lakes, reservoirs, and streams.

Progress to Date:

Word-of-mouth is the best endorsement for this type of service. The agency has ensured that the laboratory will remain a water quality monitoring service, long-term. All technicians are hand-picked and trained in macroinvertebrate taxonomy. For particularly difficult macroinvertebrate identification, we have an aquatic graduate student population who can lend that extra hand.

Future Plans:

Updating equipment and remodeling the current laboratory are foremost. With the expansion of useable lab space and equipment upgrade, the lab is better equipped to handle the heavier summer field season, sample analysis workload.

Annual membership list 1947

Member's Name	Address	City	State	Zip
Mr. J. H. Smith	123 Main St.	Springfield	Ill.	62761
Mr. W. R. Jones	456 Oak St.	Chicago	Ill.	60601
Mr. T. E. Brown	789 Elm St.	Peoria	Ill.	61601
Mr. C. D. White	101 Pine St.	Rockford	Ill.	61101
Mr. F. G. Black	202 Cedar St.	Decatur	Ill.	62521
Mr. B. A. Green	303 Birch St.	Normal	Ill.	62451
Mr. H. K. Hall	404 Maple St.	Urbana	Ill.	62501
Mr. L. M. Young	505 Walnut St.	Champaign	Ill.	61821
Mr. N. P. King	606 Elm St.	Carbondale	Ill.	62901
Mr. O. Q. Reed	707 Oak St.	Macomb	Ill.	61451
Mr. R. S. Cook	808 Pine St.	Shampaign	Ill.	61881
Mr. T. U. Bailey	909 Cedar St.	Streator	Ill.	61361
Mr. V. W. Fisher	1010 Birch St.	Waukegan	Ill.	60081
Mr. X. Y. Grant	1111 Maple St.	Deerfield	Ill.	60011
Mr. Z. A. Hill	1212 Walnut St.	Winnetka	Ill.	60091
Mr. A. B. Scott	1313 Elm St.	Wilmette	Ill.	60091
Mr. C. E. Green	1414 Oak St.	Northbrook	Ill.	60061
Mr. D. F. Baker	1515 Pine St.	Skokie	Ill.	60071
Mr. E. G. Adams	1616 Cedar St.	Des Plaines	Ill.	60011
Mr. F. H. Nelson	1717 Birch St.	Itasca	Ill.	60141
Mr. G. I. Carter	1818 Maple St.	Rosemont	Ill.	60011
Mr. H. J. Evans	1919 Walnut St.	Wilmette	Ill.	60091
Mr. I. K. Roberts	2020 Elm St.	Winnetka	Ill.	60091
Mr. J. L. Turner	2121 Oak St.	Northbrook	Ill.	60061
Mr. K. M. Phillips	2222 Pine St.	Skokie	Ill.	60071
Mr. L. N. Wright	2323 Cedar St.	Des Plaines	Ill.	60011
Mr. M. O. King	2424 Birch St.	Itasca	Ill.	60141
Mr. P. Q. Green	2525 Maple St.	Rosemont	Ill.	60011
Mr. R. S. Baker	2626 Walnut St.	Wilmette	Ill.	60091
Mr. T. U. Adams	2727 Elm St.	Winnetka	Ill.	60091
Mr. V. W. Nelson	2828 Oak St.	Northbrook	Ill.	60061
Mr. X. Y. Carter	2929 Pine St.	Skokie	Ill.	60071
Mr. Z. A. Evans	3030 Cedar St.	Des Plaines	Ill.	60011
Mr. A. B. Roberts	3131 Birch St.	Itasca	Ill.	60141
Mr. C. E. Turner	3232 Maple St.	Rosemont	Ill.	60011
Mr. D. F. Phillips	3333 Walnut St.	Wilmette	Ill.	60091
Mr. E. G. Wright	3434 Elm St.	Winnetka	Ill.	60091
Mr. F. H. King	3535 Oak St.	Northbrook	Ill.	60061
Mr. G. I. Green	3636 Pine St.	Skokie	Ill.	60071
Mr. H. J. Baker	3737 Cedar St.	Des Plaines	Ill.	60011
Mr. I. K. Adams	3838 Birch St.	Itasca	Ill.	60141
Mr. J. L. Nelson	3939 Maple St.	Rosemont	Ill.	60011
Mr. K. M. Carter	4040 Walnut St.	Wilmette	Ill.	60091
Mr. L. N. Evans	4141 Elm St.	Winnetka	Ill.	60091
Mr. M. O. Nelson	4242 Oak St.	Northbrook	Ill.	60061
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Mr. A. B. Baker	5151 Cedar St.	Des Plaines	Ill.	60011
Mr. C. E. Adams	5252 Birch St.	Itasca	Ill.	60141
Mr. D. F. Nelson	5353 Maple St.	Rosemont	Ill.	60011
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Mr. G. I. Wright	7676 Elm St.	Winnetka	Ill.	60091
Mr. H. J. King	7777 Oak St.	Northbrook	Ill.	60061
Mr. I. K. Green	7878 Pine St.	Skokie	Ill.	60071
Mr. J. L. Baker	7979 Cedar St.	Des Plaines	Ill.	60011
Mr. K. M. Adams	8080 Birch St.	Itasca	Ill.	60141
Mr. L. N. Nelson	8181 Maple St.	Rosemont	Ill.	60011
Mr. M. O. Carter	8282 Walnut St.	Wilmette	Ill.	60091
Mr. N. P. Evans	8383 Elm St.	Winnetka	Ill.	60091
Mr. O. Q. Nelson	8484 Oak St.	Northbrook	Ill.	60061
Mr. P. Q. Carter	8585 Pine St.	Skokie	Ill.	60071
Mr. R. S. Evans	8686 Cedar St.	Des Plaines	Ill.	60011
Mr. T. U. Roberts	8787 Birch St.	Itasca	Ill.	60141
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Mr. Z. A. Wright	9090 Elm St.	Winnetka	Ill.	60091
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Mr. E. G. Adams	9494 Birch St.	Itasca	Ill.	60141
Mr. F. H. Nelson	9595 Maple St.	Rosemont	Ill.	60011
Mr. G. I. Carter	9696 Walnut St.	Wilmette	Ill.	60091
Mr. H. J. Evans	9797 Elm St.	Winnetka	Ill.	60091
Mr. I. K. Nelson	9898 Oak St.	Northbrook	Ill.	60061
Mr. J. L. Carter	9999 Pine St.	Skokie	Ill.	60071

The purpose of this list is to provide a record of the names and addresses of the members of the organization for the year 1947. It is hoped that this list will be useful to the members of the organization in their efforts to contact one another and to the organization in its efforts to contact its members.

The list is arranged in alphabetical order by the last name of the member. The first name of the member is given in parentheses after the last name. The address of the member is given in parentheses after the first name. The city, state, and zip code of the member are given in parentheses after the address.

The list is intended to be a permanent record of the names and addresses of the members of the organization for the year 1947. It is hoped that this list will be useful to the members of the organization in their efforts to contact one another and to the organization in its efforts to contact its members.

Model academic program in the management of nuisance fish and wildlife

Collaborating Agency(ies): USDA APHIS Animal Damage Control
USDA Forest Service

Project Location: Utah State University
College of Natural Resources

Project Duration: June 1990 - September 1997

Investigators: Michael R. Conover
Robert H. Schmidt

Berryman Fellows: Kimberly K. Kessler
Rolla V. Ward
Randy O. Farrar
Wendy Sanborn
Kristen P. LaVine

Goals and Objectives:

To develop an academic program for solving problems in wildlife damage management.

To support the goals and objectives of the Jack Berryman Institute.

Progress to Date:

The academic program in nuisance fish and wildlife is now the benchmark for other fledgling programs. We have already produced many scholarly publications, extension products, and graduates who have found employment in wildlife management and are helping to manage this nation's wildlife legacy.

Future Plans:

For the Berryman Institute to become an internationally-recognized center for research in human/wildlife relationships, urban wildlife management, predator/prey relationships, wildlife damage management and exotic species ecology.

Model research program in the management of estuarine fish and wildlife

1987-1988
1989-1990

1991-1992

1993-1994
1995-1996

1997-1998

1999-2000

2001-2002

2003-2004
2005-2006

2007-2008

2009-2010
2011-2012
2013-2014
2015-2016
2017-2018
2019-2020

2021-2022

2023-2024

2025-2026

2027-2028

2029-2030

2031-2032

2033-2034

2035-2036

2037-2038

2039-2040

2041-2042

2043-2044

2045-2046

2047-2048

**A study of a population of feral cats
on the Naval Auxiliary Landing Field,
San Clemente Island, California**

Collaborating Agency(ies): Department of Defense, Navy

Project Location: San Clemente Island, California

Project Duration: September 1992 - June 1995

Investigators: Robert H. Schmidt
R. Brand Phillips

Technicians: Frans Juola Bruce Rodriguez
Alexander Webb Craig Thompson

Goals and Objectives:

The feral cat (*Felis catus*) has been identified through earlier studies as one of the primary predators of the endangered San Clemente Island (SCI) loggerhead shrike. However, no data on the ecology of the cat has been collected on SCI. This data is critical to developing an effective management strategy for this animal. Sound management techniques developed here would reduce feral cat damage without adverse effect on the unique ecosystem of San Clemente Island.

Progress to Date:

Data was extremely difficult to obtain due to the geography of the island. However, three field seasons have been completed. Data has been collected and analyzed, and is now the core of the thesis being written by Mr. Phillips. Reports have been forwarded to the Navy.

Future Plans:

The study is now complete. The information gathered and assessed from this study will become the backbone for policies and instructions for the armed forces to deal with feral cat populations on military installations.

A study of a population of birds on the Pacific Islands (Laysan Island) from 1900 to 1950

Year	Population	Notes
1900	100	First census
1910	120	Second census
1920	150	Third census
1930	180	Fourth census
1940	200	Fifth census
1950	220	Sixth census

Summary of the study: The population of birds on Laysan Island has increased steadily from 1900 to 1950, with a total increase of 120%.

The study was conducted by the U.S. Fish and Wildlife Service, and the results are presented in this report. The data shows that the population of birds on Laysan Island has increased steadily from 1900 to 1950, with a total increase of 120%. The study was conducted by the U.S. Fish and Wildlife Service, and the results are presented in this report.

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Analysis of issues and problems in wildlife damage management

Collaborating Agency(ies): USDI Fish & Wildlife Service
International Association of Fisheries and
Wildlife Agencies

Project Location: Utah State University
College of Natural Resources

Project Duration: August 1994 - August 1996

Investigators: Michael R. Conover
Michael L. Wolfe
Todd A. Crowl
David A. Beauchamp
Robert H. Schmidt
Terry A. Messmer

Goals and Objectives:

This program will help resolve human/wildlife conflicts and provide data that society can use to manage its resources more effectively. Programs under this agreement include: contraceptive strategies for managing populations of wildlife; educational outreach strategies to facilitate resolution of fish and wildlife damage management conflicts; strategies to reduce bird predation at hatcheries; management of urban goose populations; and to sponsor national symposia on the management of urban wildlife.

Progress to Date:

Personnel have been appointed to spearhead the immuno-contraception, and education outreach phases of this project. Several publications have resulted from this work. We also have sponsored and organized several national symposia on the above topics.

Future Plans:

Wildlife damage management problems are complex and dynamic. We expect to be involved in research and technology transfer in this general area for many years.

Analysis of needs and problems in wildlife damage management

Editorial Board
International Association of Wildlife
Managers

John E. Hume
College of Natural Resources

College of Natural Resources

Michael E. Conner
Michael J. Walsh
John A. Clark
David A. Borchert
Robert H. Borchert
Terry A. Borchert

It is the purpose of this journal to provide a forum for the exchange of information and ideas among wildlife managers and researchers.

The journal is published quarterly and is intended to provide a forum for the exchange of information and ideas among wildlife managers and researchers. The journal is published quarterly and is intended to provide a forum for the exchange of information and ideas among wildlife managers and researchers. The journal is published quarterly and is intended to provide a forum for the exchange of information and ideas among wildlife managers and researchers.

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**Cost share agreement: human-bear
interactions at Anan Creek,
Tongass National Forest,
Stikine Area, Alaska**

Collaborating Agency(ies): USDA Forest Service
Alaska Department of Game and Fish

Project Location: Anan Creek, Stikine Area, Alaska

Project Duration: June 1993 - September 1995

Investigators: Barrie K. Gilbert
Danielle K. Chi

Technicians: Chad Mellison
Derek Staab
Gretchen Shuey

Volunteers: Curtis Rex Reed

Goals and Objectives:

This behavior study of bears will assist in the management of biological diversity as impacted by recreational visitation and timber clear-cutting in Tongass National Forest, Alaska -- a very large temperate rain forest. This research will assist accurate predictions for planning of public use.

Progress to Date:

From the data collected over the past two seasons, it is apparent that the current distribution of black bears on Anan Creek as well as the individual variation observed in their responses to people result from an interplay of many important variables (e.g., habitat quality, alternate food sources, home range size, prevalent use of caves, response of bears to human presence or activity, etc.).

Future Plans:

DRAFT

2000

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**LTERR: "Succession, biodiversity, and
ecosystem functioning at the prairie-forest
border," subcontract with the University of
Minnesota**

Collaborating Agency(ies): National Science Foundation
University of Minnesota

Project Location: Cedar Creek Natural History Area, Minnesota

Project Duration: October 1994 - September 1995

Investigators: Mark Ritchie

Goals and Objectives:

This project explores the factors that control the diversity of annual and plant species in ecosystems. The results should improve our understanding of how conserving species will improve the stability of managed ecosystems and provide a stable, long-term economic base for land management.

Progress to Date:

We sampled the abundance of various consumer and plant species, as well as available soil nitrogen, inside and outside bird exclosures located on fertilized and unfertilized plots. We trapped for vertebrate arthropod predators and lizards. Plant biomass and species composition were sampled. Intermediate predators were found in significantly greater abundance inside bird exclosures, and this was true for both arthropods and vertebrate predators. Concomitantly, grasshoppers occurred at significantly lower density and biomass inside bird exclosures, and these effects were largely the same for all grasshopper species. Total legume abundance was significantly greater in plots with herbivores excluded. Late summer total legume biomass within herbivore exclosures increased strongly following exclosure established in 1982, declined dramatically following a severe drought in 1988, and then increased again following the drought. The results suggest that herbivores and nutrients other than nitrogen may be critical in structuring grassland communities and influencing succession, even in nitrogen-poor soils.

Future Plans:

To continue the objectives and goals of the next five years of this six-year study.

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Department of Education
Brooklyn, New York

Brooklyn, New York

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**Migration routes, habitat use and suitability
base map, wintering areas and
mortality of the
Paunsaugunt mule deer herd**

Collaborating Agency(ies): USDI Bureau of Land Management
Utah Agricultural Experiment Station
Utah Department of Wildlife Resources
Arizona Game and Fish Department

Project Location: Paunsaugunt Plateau, UT, to Kaibab Plateau, AZ

Project Duration: July 1994 - September 1995

Investigators: Dr. Terry A. Messmer
Paul Klimack

Goals and Objectives:

The objectives of this study are to determine the timing, duration, corridors, highway crossings, extent of migrations, and habitat use patterns for mule deer that summer on the Paunsaugunt Plateau and winter along the Utah/Arizona border. This information will be essential for the development of an interstate mule deer herd management plan that acknowledges economic, recreational, and public safety interests of the area landowners, industry, and the citizens of both states.

Progress to Date:

We have followed the 12 mule deer does that were captured around the Alton, UT, area to their winter range. Most of the animals occupied winter ranges around the Utah/Arizona border with two animals moving 5 miles into Arizona. Once the migration started, the animals moved within a matter of days, over a distance of 40 miles from the point of capture to their winter ranges. Two of these original 12 animals have died. One was shot during the hunting season and the other died February 1995, of natural causes. These animals started their migration mid-October with most crossing US Highway 89 by mid-November. It appears that these animals used 3 migration corridors, with most animals using the Johnson's Canyon corridor. Most of the crossings on US Highway 89 occurred between mile points 38 - 44. On the evening of October 22, 1994, a total of 22 deer kills were documented in this area.

Future Plans:

More extension work will be done during 1995 spring and fall migrations to narrow down crossing sites and timing.

Environmental Impact Statement for the Proposed Construction and Operation of the [Project Name]

This document is a preliminary draft of the Environmental Impact Statement (EIS) for the proposed construction and operation of the [Project Name]. It is intended to provide a general overview of the project and its potential impacts on the environment. The EIS will be updated as more information becomes available.

The project is located in [Location]. It consists of [Description of Project]. The project is expected to have both direct and indirect impacts on the environment. These impacts include [List of Impacts].

The following table provides a summary of the project's impacts and the measures proposed to avoid, minimize, or compensate for them.

Impact	Proposed Mitigation Measures
[Impact 1]	[Mitigation Measure 1]
[Impact 2]	[Mitigation Measure 2]
[Impact 3]	[Mitigation Measure 3]

The purpose of this EIS is to provide decision-makers with the information they need to understand the potential impacts of the project and to make informed decisions about whether to approve the project and what conditions should be attached to any approval. The EIS will also provide information to the public about the project and its impacts, and will provide an opportunity for the public to comment on the project and its impacts.

The EIS will be prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) and the Federal Acquisition Regulation (FAR). The EIS will be prepared in a format that is consistent with the requirements of the NEPA and FAR, and will be made available to the public for review and comment.

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This document is a preliminary draft of the Environmental Impact Statement (EIS) for the proposed construction and operation of the [Project Name]. It is intended to provide a general overview of the project and its potential impacts on the environment. The EIS will be updated as more information becomes available.

**ILTER: "Luquillo experimental forest,"
subcontract with the
University of Puerto Rico**

Collaborating Agency(ies): National Science Foundation
University of Puerto Rico, Terrestrial Ecology Division

Project Location: Luquillo Experimental Rainforest, PR

Project Duration: October 1994 - October 1995

Investigators: Todd A. Crowl

Goals and Objectives:

Deforestation is a major concern globally. This proposal addresses the dynamics of different natural disturbances in comparison to human-induced disturbances such as logging and burning. The results of this project will be used to modify existing management regimes in tropical forests, with a specific emphasis on minimizing negative ecosystem effects.

Hypothesis 1: The decapod community is characterized by different functional feeding groups which maximize the use and retention of different carbon sources which are available depending on the disturbance regime in the riparian zone.

Hypothesis 2: Changes in early successional tree species in riparian areas will affect stream community dynamics through changes in leaf litter dynamics and through changes in nutrient inputs.

Hypothesis 3: The meso- and micro-habitat variables that determine shrimp population distributions and abundances within single drainages can be used to determine among-watershed distribution patterns of shrimp throughout the Luquillo Experimental Forest (LEF).

Progress to Date:

H1: We removed *Atya* Shrimp only, *Xiphocarus* shrimp only and both types of shrimp from small reaches of stream on a weekly basis. Small headwater streams with steep gradients and relatively small pools were used to minimize re-colonization dynamics.

H2: We used existing maps of tree species distribution along the riparian corridors to select which species of tree were used for leaf litter manipulations. Leaf inputs of a single species

THE "LITTLE" EXPERIMENTAL LABORATORY

THE "LITTLE" EXPERIMENTAL LABORATORY is a small, but complete, laboratory for the study of the principles of physics. It is designed for use in the high school or college laboratory, and is suitable for the study of the principles of physics, mechanics, and electricity.

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were compared with mixed species to determine retention of leaf litter in streams and their effects on the aquatic community.

H3: We measured meso- and micro-habitat variables in different streams within the LEF two times. At the same time, shrimp species composition and abundances were determined using standard trapping methodologies.

Future Plans:

H1: Aquatic insect communities will be sampled to determine if changes in the overall community occur.

H2: We will monitor changes in detritivore populations associated with different quantities and types of leaf litter as well as structural complexity provided by the litter during the processing stages.

H3: We will use standard multi-variate techniques to determine whether relative shrimp abundances can be predicted at the among-watershed level using similar models that successfully predict within-stream patterns.

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**LTER: "Virginia Coast Reserve,"
subcontract with the University of Virginia**

Collaborating Agency(ies): National Science Foundation
University of Virginia
National Biological Service (NBS)
The Nature Conservancy

Project Location: Virginia Coast Reserve, Oyster, VA

Project Duration: February 1995 - October 1996

Investigators: Raymond D. Dueser
Charles Randolph Carlson

Goals and Objectives:

This project examines the influence of physical disturbance on the biogeography and ecology of mammals on the Virginia barrier islands. These islands are subject to the influence of both long-term and secular rise in sea level and a stochastic variation in climate. This research requires both detailed topographic surveys of the islands and repeated surveys of mammal distribution and abundance. Specific objectives include: (1) Provide technical support and training in Global Positioning System and Laser Theodolite techniques. (2) Conduct routine mammal trapping sessions on the Virginia barrier islands. (3) Collect meteorological and tidal data related to possible extinctions and/or colonizations of small mammals. (4) Provide population statistics on flora associated with overwash fans for integration into disturbance factors. The resulting data will be incorporated into a simulation model of island overwash, flooding and movement under a regime of climatic variability. This model will allow estimates of flooding frequency and extinction roles for insular mammal populations.

Progress to Date:

Work is preceding on schedule with the exception of the small mammal trapping logistics. The kinematic topographic survey is underway on the islands during 1995. Periodic mammal trapping was instituted in 1994.

Future Plans:

Work will begin on the flood frequency-extinction probability model in 1996.

Spawning and recruitment of Strawberry Reservoir salmonids

Collaborating Agency(ies): Utah Division of Wildlife Resources, Central Utah
Project

Project Location: Strawberry Valley, Utah

Project Duration: March 1994 - September 1996

Investigators: David A. Beauchamp
Mary C. Griffin
Curtis Knight

Technicians: Jeffrey Godfrey
Jane Chen
Fredrik Norrsell
John Ossowski

Goals and Objectives:

The primary goal of this project is to assess the ability of Bear Lake cutthroat trout and kokanee salmon to sustain a sport fishery at desirable levels through natural reproduction in the tributaries and reservoir.

Progress to Date:

We measured the timing, distribution, abundance, fecundity, and egg retention of spawning cutthroat trout and kokanees to estimate total egg deposition in the three major tributaries to the reservoir. By estimating stage-specific survival of cutthroat trout eggs, and enumerating lakeward-migrating fry, we determined that egg-to-fry survival ranged 12-25% among the tributaries. Of the estimated total fry emergence, 16-32% of these migrated directly to the reservoir, whereas the rest remained in the streams for up to two years. These results suggest that tributary-rearing is an important strategy for successful recruitment into Strawberry Reservoir. Direct migration after emergence is an alternative strategy employed by a significant fraction of fry. High growth but low survival for migrating fry versus lower growth but higher survival for the stream resident strategy presents an important trade-off to cutthroat fry with potentially large differences in lifetime reproductive success.

Data on timing, distribution, sex ratio, fecundity, and abundance of kokanee spawners were collected during September-November 1994. An estimated 3.7 million eggs were deposited by 3,400 females in the three major tributaries. Egg-to-fry survival will be determined when fry emerge later this winter or spring.

7/14/95

Future Plans:

Field collection will continue for another spawning and emergence cycle for both kokanees and cutthroat trout. Additional effort will be directed at life history trade-offs.

Cooperating Agency/ies: U.S. Bureau of Reclamation
Utah Dept. of Transportation
Utah Division of Wildlife Resources

Project Location: Brimley Reservoir, Utah, USA

Project Duration: September 1993 - September 1994

Investigator: Mark Lohman
John A. Hildebrand

Goals and Objectives:

The main objective of the study is to determine the effectiveness of a newly designed highway corridor for reducing fish highway mortality. New guardrails and signs have been installed and are being tested along three mile road inside the Brimley Reservoir. Prior to current construction, two mile stretch of road, from highway to reservoir, had no guardrails. The new highway, in which heavy guardrails have been installed, will reduce fish mortality. As a result, more kokanee and cutthroat trout will survive in the lake.

Progress to Date:

Construction of the corridor was completed in mid-September 1994 and was open to traffic under way. Highway mortality levels in experimental corridor have been reduced and fish mortality has been reduced. Other areas of road and guardrails and signage within the corridor have been completed and will be open to traffic. These observations will continue throughout the year. Speed cameras, mounted by UTAH, have been used to monitor the corridor. Following the study approach and results through the study period. The study will be used to evaluate the effectiveness of one-way road guardrails with experimental corridor and will be used to evaluate the highway right of way.

Future Plans:

Continuation of the corridor will continue for another spawning season. Computer simulation modeling will be used to predict how the high levels of highway mortality have affected the lake and stream fishery. The results of the study will be used to predict what the population may look like in the future if the experimental corridor is effective in reducing highway mortality.

1. The first part of the report is devoted to a description of the work done during the year. It is divided into two main sections: a general description of the work and a detailed description of the results. The general description is given in the first section and the detailed description in the second section.

Evaluation of the effectiveness of a newly designed large mammal highway crosswalk

Collaborating Agency(ies): U.S. Bureau of Reclamation
Utah Dept. of Transportation
Utah Division of Wildlife Resources

Project Location: Jordanelle Reservoir area, Utah

Project Duration: September 1993 - September 1996

Investigators: Mark Lehnert
John A. Bissonette

Goals and Objectives:

The main objective of the study is to determine the effectiveness of a newly designed highway crosswalk structure for reducing deer-highway mortality. Nine experimental crosswalks have been installed and are being tested along three newly built roads surrounding the Jordanelle Reservoir. Prior to reservoir construction, two roads serviced the area. Deer-highway mortality losses along those roads was minimal. The new highways, however, bisect major mule deer (*Odocoileus hemionus*) migration routes and seasonal use areas. As a result, deer vehicle collisions have increased dramatically in the area.

Progress to Date:

Construction of the crosswalks was completed in mid-September 1994 and evaluation is currently under way. Highway mortality levels in experimental (crosswalks installed) and control areas (no crosswalks installed) are being monitored. Observations of deer and elk behavior and activities within the crosswalk zones have been conducted this fall with the use of special night-vision equipment. These observations will continue throughout the year. Speed counters, installed by UDOT, have been used to analyze the response of motorists as they approach and move through the deer-crossing areas. Track beds are being used to evaluate the effectiveness of one-way escape gates installed with experimental crosswalks that enable trapped deer to escape the highway right-of-way.

Future Plans:

Evaluation of the crosswalks will continue for another eighteen months. Computer simulation modelling will be used to explore how the high levels of highway mortality have altered the size and characteristics (i.e., sex ratios and age structure) of the Jordanelle deer population. The model also will be used to predict what the population may look like in the future if the experimental crosswalks are effective at reducing highway mortality.

Evaluation of the effectiveness of a newly designed large animal restraint apparatus

Department of Veterinary Medicine
University of Guelph
Guelph, Ontario N1G 2W1
Canada
Dr. J. M. Ross
Dr. A. J. Ross

Received 10/10/91 Accepted 11/10/91

Abstract
The purpose of this study was to evaluate the effectiveness of a newly designed large animal restraint apparatus. The apparatus was designed to restrain a horse in a standing position. The apparatus was tested on 10 horses of various breeds and ages. The results of the study showed that the apparatus was effective in restraining the horses. The horses were able to stand comfortably and did not show any signs of distress. The apparatus was found to be a useful tool for veterinary procedures.

Introduction
The purpose of this study was to evaluate the effectiveness of a newly designed large animal restraint apparatus. The apparatus was designed to restrain a horse in a standing position. The apparatus was tested on 10 horses of various breeds and ages. The results of the study showed that the apparatus was effective in restraining the horses. The horses were able to stand comfortably and did not show any signs of distress. The apparatus was found to be a useful tool for veterinary procedures.

Materials and Methods
The apparatus was tested on 10 horses of various breeds and ages. The horses were restrained in the apparatus for a period of 10 minutes. The results of the study showed that the apparatus was effective in restraining the horses. The horses were able to stand comfortably and did not show any signs of distress. The apparatus was found to be a useful tool for veterinary procedures.

A landscape approach to modeling habitat use and monitoring population trends of the American marten

Collaborating Agency(ies): USDA Forest Service
Utah Division of Wildlife Resources
Utah Wilderness Association

Project Location: Uinta Mountains of northeastern Utah

Project Duration: September 1990 - December 1994

Investigators: Christina D. Hargis
John A. Bissonette

Technicians: Peter Lortz
Rob Rood
Sheldon Cooper

Goals and Objectives:

Interest in the American marten has increased because the continued harvest of old growth timber could potentially affect the population viability of this species. Previous studies indicated that optimal habitat is characterized by late seral stage coniferous forests. However, the degree to which man-induced fragmentation alters habitat quality is unknown. Marten are believed to be core-sensitive, requiring large unbroken tracts of forest for all stages of life history. Information is needed on marten population responses to increased levels of fragmentation.

The goal of the study is to create a model that predicts changes in marten habitat quality due to fragmentation. The objectives are: (1) determine an appropriate quantitative measure of fragmentation; (2) test for difference in marten relative densities and weights across a spectrum of fragmentation levels; (3) test for differences in prey (i.e., small mammal) numbers, biomass and productivity across the fragmentation spectrum; and (4) examine the relationship between protective cover and prey availability to explain marten responses to fragmentation.

Progress to Date:

Data from the first two seasons indicated that the highest marten densities were found in sites with moderate levels of fragmentation. In highly fragmented sites, martens were at low densities or were undetected. Analysis of small mammal data indicated a high correlation

between marten density and the abundance of red-backed voles (Clethrionomys gapperi). High densities of voles appeared to offset the habitat loss due to fragmentation.

In 1993, four new sites were surveyed for marten and small mammals in order to assess the model results observed during the prior seasons. These sites were selected to cover the range of fragmentation. One site was unfragmented, two were moderately fragmented, and one was highly fragmented. Data obtained from these sites did not support the original model results. The difference in response was attributed to a severe decline in prey availability. In 1992, an average of 15.5 small mammals were captured per 100 trapnights. In comparison, the average was 3.4 in 1993. Recaptures of martens showed substantial movement of individuals, indicating a mobile population in response to the low prey.

Future Plans:

We will perform a spatial analysis of the study sites, using ERDAS and a variety of fragmentation measures. Additionally, analysis of forest structure data will determine whether differences in marten numbers can be attributed to microsite characteristics, such as abundance of coarse woody debris. Data analysis will be completed by February 1995.

National Gap Analysis Program

Collaborating Agency(ies): National Biological Service

Project Location: Logan, Utah

Project Duration: October 1992 - September 1996

Investigators: Thomas C. Edwards, Jr.
Allan Falconer
Collin Homer
Scott Bassett

Technicians: Brian Biggs, Mary Jane Crandall, Matthew McCune,
Janene Shupe, Manjula Vangipuram

Goals and Objectives:

The National Gap Analysis Center was established at the UT CFWRU in 1992 to synthesize state-based gap analysis data sets into ecoregional coverages. Objectives of the research are to (1) merge all U.S. state-based gap data sets into ecoregions, (2) perform gap analysis by ecoregion, (3) provide assistance to state gap analysis programs, and (4) facilitate linkages with other federal, state, and NGO biodiversity programs. Edgematches are in process for the Colorado Plateau and Mojave portions of the Great Basin ecoregions. Considerable effort was expended on developing an "ecologically smart" aggregation routine for stepping up cover-maps from ~1 ha to the GAP-specified 100 ha MMU. The routine has been applied to Utah, and parts of Nevada and Arizona. We also completed, in conjunction with UNEP, a GAP Analysis encyclopedia accessible through the INTERNET via the World Wide Web using a hypermedia viewer such as NCSA Mosaic. Its Universal Resource Locator (URL) is:

<http://www.nr.usu.edu/gap/gaphome.htm>

Future Plans:

Ongoing projects include creation of interactive querying capabilities of Gap Analysis Information and edgematching between Utah and Wyoming.

Memorandum for the President

Subject: [Illegible]

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Gap Analysis Prototype Products

Collaborating Agency(ies): National Biological Service
U.S. Geological Survey

Project Location: Logan, Utah

Project Duration: April 1993 - September 1994

Investigators: Thomas C. Edwards, Jr.
Allan Falconer
Douglas W. Wight
Collin G. Homer
Scott Bassett

Technicians: Teresa Swiatek
Matthew McCune

The Gap Analysis Prototype Products project has progressed to the finalization of four maps depicting biodiversity management in Utah. Discussions relative to the production of a CD to store GAP analysis information and disseminate to users were made at the EROS Data Center in Sioux Falls, South Dakota, by Allan Falconer and Douglas Ramsey. Following these discussions, individuals from the EROS Data Center (John Hutchinson and Jack Whittmann) visited USU to discuss the composition of final map products. During this visit, map content was finalized and the tasks of data generation and clean-up were assigned to either USU or the USGS. To date all tasks have been completed except for the finalization of legend layout and supporting map layers (i.e. roads, place names, etc.). Publication of the Utah maps, CD-ROMs containing the information, and a final report is expected in February of 1995.

Gap Analysis Strategic Plan

Project Name	Project Description
Project 1	Project 1 Description
Project 2	Project 2 Description
Project 3	Project 3 Description
Project 4	Project 4 Description
Project 5	Project 5 Description
Project 6	Project 6 Description
Project 7	Project 7 Description
Project 8	Project 8 Description
Project 9	Project 9 Description
Project 10	Project 10 Description

The Gap Analysis Strategic Plan is a document that outlines the strategic direction of the organization. It provides a clear vision of the future and identifies the key areas of focus for the organization. The plan is developed by the senior management team and is approved by the board of directors. It serves as a guide for all organizational activities and is updated regularly to reflect changes in the business environment.

The plan is organized into several sections, including an executive summary, a vision statement, a mission statement, and a series of strategic objectives. Each objective is supported by specific actions and initiatives. The plan also includes a timeline and a budget, which provide a clear picture of the organization's financial and operational needs.

The Gap Analysis Strategic Plan is a critical document for the organization, as it provides a clear direction for the future and ensures that all activities are aligned with the organization's overall goals and objectives. It is a living document that is updated regularly to reflect changes in the business environment.

Research and development for a nation-wide decision support system using GIS and remote sensing

Collaborating Agency(ies): National Guard Bureau through U.S. Fish and Wildlife Service

Project Location: Utah State University

Project Duration: August 1993 - September 1997

Investigators: Allan Falconer
Doug Ramsey
Dave Roberts

Research Associate: Aaron Price, Captain, National Guard

Technicians: Brian Biggs, Merland Haliski, Kimberly Patraw,
Richard Spencer

Project Status and Progress:

The goal is to build a GIS data base for the National Guard Bureau Environmental office (NGB-ARE).

1. An initial needs assessment has been completed.
2. Equipment, personnel, and data needs have been identified for a national level environmental database.
3. Equipment has been purchased, graduate students have been identified, and data are being compiled.

Discussion about the use of the environmental data for training requirements are underway. A prototype National Environmental Database (NED) structure has been completed and partly populated with nationwide biophysical information produced by various state and federal agencies. The database is hierarchical and allows the user to quickly examine environmental data layers at the national, ecoregion, state, and local levels. This structure allows cross-scale comparison and evaluation of land information. The user can move from a national perspective view to ground level field plot information and maintain proper geographic and ecological relationships. A data analysis interface has been produced to make

Memorandum for the President and the Secretary of State

Subject: The situation in the Middle East and the possibility of a settlement.

Reference is made to the report of the Secretary of State dated 10/10/57.

The Secretary of State has requested that the President be kept informed of the progress of the negotiations.

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use of the database as easy as possible. The system makes extensive use of ARC/INFO macro and menu language to provide the user interface.

Data for the local level (training installation) has been compiled primarily for the Orchard Training Area in Idaho and Camp W. G. Williams in Utah. These data have been integrated into the system and work continues to develop Land-Condition-Trend-Analysis (LCTA) tools to evaluate ecosystem health and trend. Software has been developed for summarizing and presenting data collected through the LCTA program. We are in consultation with camp environmental officers to develop tools and collect data to address management problems. Information about an additional 50 training camps located throughout the U. S. and Puerto Rico has been received and is being entered into the system.

Research continues to address questions of scale change, and the proper dissemination of the database through the Internet.

The vision for the national environmental database is a multiscale, analytical environmental atlas of the nation that can be used by the NGB-ARE to evaluate their lands for training of National Guard Troops.

Of note: An external evaluation of this project by Dr. John Jensen of the University of South Carolina was completed in December 1995 and is available for review.

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Refinement of the Utah Gap Analysis base vegetation map for use in vegetation inventories

Collaborating Agency(ies): USDA Forest Service

Project Location: Logan, Utah

Project Duration: October 1993 - September 1995

Investigators: Thomas C. Edward, Jr.
Gretchen G. Moisen
Collin G. Homer

Technicians: David Early, Matthew McCune

Project Objectives:

Project objectives are to (1) refine the gap analysis base vegetation map of Utah, by incorporating three canopy cover classes (10-40%, 41-70%, >70%) for forested lands in Utah; (2) further develop decision rule sets from existing ecological information for mapping plant communities in Utah; (3) update the digital base land ownership map for Utah, including Forest Service administrative boundaries; (4) develop protocol for and perform an accuracy assessment of the state vegetation map; (5) develop statistical methods for extrapolating point information to polygon level; and (6) evaluate general techniques for combining the vegetation map with other extant data sources to meet Forest Service management objectives.

Progress to Date:

All objectives except for #5 are completed.

Estimation of the First-Order Analysis Error for the in a Regression Framework

Author(s): [Name]

Project Location: [Location]

Project Duration: [Duration]

Investigator: [Name]
[Name]
[Name]

Project Title: [Title]

Abstract: [Abstract text]

Project Description: [Detailed description of the project, its objectives, and the methods used. This section typically includes a background on the problem, a statement of the research questions, and a summary of the data and analysis.]

Keywords: [Keywords]

Wild-strain mallard release project

Collaborating Agency(ies): U.S. Bureau of Reclamation
North Dakota Game and Fish Department
U.S. Fish and Wildlife Service
Dakota Wildlife Trust
Delta Waterfowl Research Foundation

Project Location: Prairie Pothole Region of North Dakota

Project Duration: 1993 - 1998

Investigators: Dr. Terry Messmer
Charles Dixon
Scott Barras

Technicians: Brenda Dixon, Amy Barras, Paul Klimack, Bruce Bishoff, Rachel Pieterick, Monaca Noble, Mike Bigger, Stacy Kreiser, Kathy Olstad, James McMillan, Theresa Olson, Rick Bohn, Melissa Brown, Michelle Colson, Curtis Hendricks, Matt Lucia, Ann Malan, Sue Majors, Scott Kelly

Goals and Objectives:

The objectives are to: 1) determine the effect of releasing captive-reared wild-strain mallards into areas of improved cover on local breeding populations; 2) evaluate census methods for mallard populations at high numbers; 3) evaluate the Modified Gentle Release method of duckling release; 4) determine homing rates of male and female captive-reared wild-strain mallards released to the wild; 5) determine dispersal of captive-reared wild-strain mallards from the release site; 6) evaluate man-made islands as possible release sites for wild-strain mallards; and 7) compare migration of released mallards to wild mallards.

Progress to Date:

We identified and evaluated 70, 4-square mile sites in the prairie pothole region of North Dakota. From these, 24 upland (12 release and 12 control) and 3 island sites were selected as study sites, access was obtained, and ducklings were released on the 3 island and 12 upland sites (200/site, 100 males and 100 females, all nasal saddled and leg banded) by the Modified Gentle Release method. The release sites were surveyed every third day post release until the ducklings fledged to conduct dead and live bird counts, determine feed use, and fill feeders.

The first year of monitoring was completed in the spring of 1994. Two, three person crews conducted breeding pair ground surveys for mallards on the 4 square mile sites from April 20 through May 31 to address questions dealing with the releases. Each crew surveyed one site per day with each of the 24 study sites being surveyed three times during the survey period. Survey crews began 1 hour after sunrise and followed predetermined routes until the entire area was surveyed. Roadside surveys were conducted immediately following the ground surveys each day.

A third crew gathered data to evaluate methods of surveying mallards on 6 study sites. This crew conducted morning and evening surveys, adhering to the methodology described above. However, roadside accounts were conducted prior to the ground counts and aerial surveys were conducted approximately every third day. Each site was surveyed 6 times, 3 times each during the first half and last half of the survey period.

Future Plans:

Morning *indicated-pair* counts will be conducted at control and release sites each of the next 3 years between April 20 and May 31 to determine the size of the mallard breeding population at each site. Afternoon *indicated pair* counts and aerial surveys will be conducted on selected sites. Results of the afternoon surveys will be compared to the morning surveys. Systematic searches of the release sites and surrounding wetlands will be conducted to determine homing rates of wild-strain mallards and dispersal from the release sites. Band returns will be evaluated to compare migration and survival of the wild-strain to a cohort of wild mallards banded in the same area.

Investigation of Stocked Sockeye Salmon Fry Mortality in Margaret Lake, Alaska

Collaborating Agency(ies): USDA Forest Service
Pacific Northwest Research Station

Project Location: Southeast Alaska

Project Duration: May 1993 - September 1995

Investigators: Margaret A. Cartwright
David A. Beauchamp

Technicians: Frederik Norrsell, Jane Chen

Short-term Contracts: Kimberly Kondzela, John Preus

Goals and Objectives:

The goal of this project is to investigate mechanisms that could account for high mortality estimates of stocked sockeye salmon fry in Margaret Lake. Objectives include: 1) quantify acute and chronic predation of stocked sockeye fry by resident trout; 2) evaluate fry mortality due to handling and transport during the stocking process; 3) assess underestimation of fry survival due to the limitation of hydroacoustic gear in nearshore areas; and 4) compare the survival of the stocked fry under two different stocking routines.

Progress to Date:

In 1994, we continued to examine the temporal-spatial patterns of piscivory on stocked sockeye salmon fry by resident salmonids including cutthroat trout, Dolly Varden, kokanee salmon, and yearling coho salmon. Preliminary results confirmed 1993 observations that cutthroat trout were the major predators on the stocked fry. We expanded our objectives this year to include two different stocking strategies to determine if fry survival could be improved by stocking method alone. Following standard stocking practices in Alaska, we released 50,000 fry into Margaret Lake in mid-day directly following transport from the hatchery in Ketchikan. Another 50,000 fry were held in a large covered pen in the lake for 10 days so fry could acclimate to the lake environment. These fry were released into the lake at night. Hydroacoustic estimates of the sockeye fry population one week after each release and four weeks after initial stock showed no significant difference in fry survival between the two stocking routines. Mortality due to the handling and transport of fry was insignificant. We are unable to evaluate hydroacoustic assessment error until we obtain

Investigation of Student Behavior Problems in Elementary Schools

The purpose of this study was to determine the relationship between student behavior problems and school factors. The study was conducted in a large urban school district. The sample consisted of 100 elementary schools. The data was collected from 1980 to 1985. The study was conducted by a team of researchers. The study was funded by the National Education Association. The study was published in the Journal of Educational Research. The study was reviewed by the American Psychological Association. The study was approved by the American Psychological Association. The study was conducted in a large urban school district. The sample consisted of 100 elementary schools. The data was collected from 1980 to 1985. The study was conducted by a team of researchers. The study was funded by the National Education Association. The study was published in the Journal of Educational Research. The study was reviewed by the American Psychological Association. The study was approved by the American Psychological Association.

nearshore sockeye fry population estimates from beach seine sampling conducted by the Forest Service.

Future Plans:

From these two years of data, we can now quantify linkages in the piscivore-prey food web within a spatial-temporal-ontogenetic framework using the Wisconsin Bioenergetics Model to determine to what extent piscivory is responsible for the high initial mortality of stocked sockeye fry in Margaret Lake. Initial simulations indicated that cutthroat predation accounted for 80% of the observed mortality within the first month of stocking. Ongoing data analysis, evaluation, and write-up of the results from 1993 and 1994 field data will be pursued in the next year.

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Development of a Monitoring Program of Sediment Storage Change, Colorado River, Grand Canyon National Park

Collaborating Agency(ies): U.S. Bureau of Reclamation
Glen Canyon Environmental Studies Program

Project Location: Grand Canyon National Park, Arizona

Project Duration: August 1992 - September 1995

Investigators: John C. Schmidt

Technicians: Andre Coleman (GIS), Michael F. Leschin (geologist),
Benjamin Thompson (GIS)

Goals and Objectives:

The purposes of this study are to:

- 1) provide maps (scale 1:2400) and associated interpretations of the June 1990 status of surficial geologic deposits of selected reaches of Grand Canyon, with concentration on post-Glen Canyon Dam fine-grained alluvial deposits; and,
- 2) provide maps (scale 1:2400) of the status of fine-grained alluvial deposits as interpreted from historical air photography for other years.

These maps and interpretation are intended for use (1) in a long-term monitoring program of alluvial deposits along the Colorado River, (2) in development of hypotheses regarding the effect of future habitat-building floods that will be similar to discharges that have occurred in the past, and (3) in developing classifications and quantitative descriptions of channel geometries that give rise to historically stable and unstable eddy deposits. Preparation of reports also provides the opportunity to assemble background data concerning sand bar topography and sedimentology and water surface elevation of detailed study sites within each reach collected by the senior author since 1985.

Progress to Date:

Mapping has been completed and reports prepared for two reaches of Grand Canyon National Park: a 10.5-km reach near Point Hansborough and Saddle Canyon and a 20-km reach near the Little Colorado River confluence. The maps have been entered into an ARC/INFO

geographic information data base. These data are being used in the development of testable hypotheses for a forthcoming experimental habitat-building flood in Grand Canyon. One peer-reviewed publication has been produced and three presentations at professional meetings have been given.

Project Title: Grand Canyon

U.S. Forest Service

Project Location:

West of Lees Ferry

Project Duration:

September 1991 - December 1994

Investigators:

David West

Michael Wolf

Project Description: This project was designed to evaluate the effects of a controlled flood on the Grand Canyon. The project was designed to evaluate the effects of a controlled flood on the Grand Canyon. The project was designed to evaluate the effects of a controlled flood on the Grand Canyon.

Goals and Objectives:

Examine the total area of the canyon above Lees Ferry and the potential consequences of a habitat. This project involved the application of using a GIS approach to evaluate large areas. The potential area is a very important location.

Progress to Date:

Final report submitted July 1994.

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Evaluation/Ranking Potential Rocky Mountain Goat Habitats in Utah

Collaborating Agency(ies): USDA/Forest Service

Project Location: State of Utah

Project Duration: September 1993 - December 1994

Investigators: David Winn
Michael Wolf

Goals and Objectives:

Evaluate the total area of the state above 8000 ft. msl for potential mountain goat habitat. This project stressed the application of using a GIS approach to evaluate large areas for potential mountain goat transplant locations.

Progress to Date:

Final report submitted March 1995.

Environmental Impact Statement for the Proposed in 1990

Environmental Impact Statement

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Environmental Impact Statement

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Environmental Impact Statement

Evaluating the Spatial and Temporal Relationships of Lodgepole Pine Trees and Mountain Pine Beetle Populations in the Uinta Mountains of the Wasatch-Cache National Forest

Collaborating Agency(ies): USDA/Forest Service

Project Location: Uinta Mountains/Utah State University

Project Duration: September 1993 - September 1994

Investigators: Allan Falconer

Technicians: John C. Binder

Goals and Objectives:

To study the Mountain Pine Beetle infestations in the Uinta Mountains of Utah and Wyoming in the period 1957-64 and analyze the spatial patterns of infestation to determine patterns of the spread of infestation.

Progress to Date:

The project came to completion in June 1995. John C. Binder completed a research Master of Science degree on this topic that revealed the value of Geographic Information Systems in predicting the spread of infestations. The results support the hypotheses that beetles respond to pheromones and travel upwind to infect larger trees in years of warmer (above the mean) conditions. Anomalous patterns are attributed to local funnelling of winds by topography. Infestations end when cold weather creates an extended 2-year reproductive cycle and numbers of beetles are greatly reduced.

Forest Dwelling Bird and Insect Spatio-Temporal Relationships

Collaborating Agency(ies): USDA/Forest Service

Project Location: Ferron Ranger District, Manti La Sal National Forest

Project Duration: April 1993 - March 1995

Investigators: David Winn
Kimberly Sullivan
Douglas Ramsey

Technicians: Todd Black, Eric Cannon, Dan Roberts

Goals and Objectives:

1. Test the National Neotropical Bird Inventory Protocol.
2. Provide a list of neotropical birds found on the Ferron and Moab Ranger Districts.
3. Develop some generalized neotropical bird habitat relationships for communities inventoried on the Ferron and Moab ranger districts.

Progress to Date:

Final reports submitted March 1995.

GAP Analysis: Development and Testing of Prototype Methodologies for Disseminating Digital GAP Analysis Data

Collaborating Agency(ies): U.S. Fish and Wildlife Service through National Biological Service

Project Location: Utah State University

Project Duration: April 1993 - September 1995

Investigators: Allan Falconer, Thomas Edwards

Technicians: Collin Homer, Doug Wight, Scott Bassett

Goals and Objectives:

Develop a prototype package to disseminate Utah GAP Analysis information to the public. Information to be disseminated in digital form on a CD-ROM and also on hard copy maps printed through a joint agreement with USGS.

Progress to Date:

The prototype package entitled "Utah GAP Analysis, an Environmental Information System" was finished in March 1995. The package contains 2 CD-ROMs with the entire digital GAP data sets including vegetation, land ownership, and predicted distribution for 525 wildlife species. A simple interface on the CD-ROM allows the potential user examples on how to use and query the data sets. Further, all associated metadata detailing the development of the data sets is available on the CD-ROM. In addition, 4 thematic maps including the TM mosaic, land ownership, vegetation and biodiversity management were printed by USGS and folded into the package. The CD-ROM was developed through a joint venture with ESRI in California and they packaged and distribute the GAP packages.

Future Plans:

Currently the USU team is concentrating on developing an ArcView 2.1 interface for use with the GAP data sets on a CD-ROM. This will allow more extensive use of the CD-ROMs in the PC environment. Work should be completed this fall.

GAP Analysis: Development and Testing of Prototype Methodologies for Determining Digital GAP Analysis Data

Contracting Agency: U.S. Environmental Protection Agency
Project Number: 100-100000-1
Project Dates: April 1991 - September 1991
Project Location: Atlanta, Georgia
Project Manager: [Name Redacted]
Project Sponsor: [Name Redacted]

The purpose of this project was to develop and test prototype methodologies for determining Digital GAP Analysis Data. The project was funded by the U.S. Environmental Protection Agency. The project was completed in September 1991. The project was a joint effort between the U.S. Environmental Protection Agency and the Georgia Department of Transportation.

The project was completed in September 1991. The project was a joint effort between the U.S. Environmental Protection Agency and the Georgia Department of Transportation. The project was funded by the U.S. Environmental Protection Agency. The project was completed in September 1991. The project was a joint effort between the U.S. Environmental Protection Agency and the Georgia Department of Transportation.

Currently the [Name Redacted] team is completing the development of the [Name Redacted] methodology. The [Name Redacted] methodology is the [Name Redacted] methodology. The [Name Redacted] methodology is the [Name Redacted] methodology.

Geomorphology of the Green and Yampa Rivers

Collaborating Agency(ies): National Park Service

Project Location: Dinosaur National Monument/Utah State University

Project Duration: May 1993 - January 1996

Investigators: John Schmidt

Technicians: Paul Grams

Goals and Objectives:

The purpose of this project is to develop a preliminary quantification of discharges necessary to maintain riparian resources of Dinosaur National Monument. Project components include

- (1) mapping of the distribution of critical resources and identification of their linkage with surficial geologic deposits,
- (2) determination of those resources that are most susceptible to change due to operations of Glen Canyon Dam,
- (3) calculation of sediment mass balances for study reaches that can be related to documented histories of channel change, and
- (4) measurement, calculation, and estimation of maintenance discharges. A final project report will be submitted in summer 1995.

Identifying and Prioritizing Sites for Riparian Wetland Restoration: A Case Study in the Upper Arkansas River Basin, Colorado

Collaborating Agency(ies): Environmental Protection Agency

Project Location: Upper Arkansas River Basin.

Project Duration: October 1992 - September 1995

Investigators: Michael P. O'Neill
Charles P. Hawkins
James P. Dobrowolski
John C. Schmidt
Christopher M.U. Neale

Graduate Students and Technicians: 3 Full-Time Graduate Student
1 Part-Time GIS Technician

Goals and Objectives:

The goal is to develop a Geographic Information System that can be used to identify and prioritize sites for riparian wetland restoration. This project integrates multi-spectral videography overflights with historic aerial photographs of the stream and riparian corridor and field surveys of stream and riparian conditions to provide information concerning the condition and historic changes in the nature and distribution of riparian wetland vegetation. The project also attempts to determine how the current distribution of riparian vegetation has been affected or developed by natural (hydrologic and/or geomorphic) events. This project will produce historic change maps of stream and riparian conditions, analyses of hydrologic and geomorphic conditions within the watershed, and linkages between historic conditions and current status of stream and riparian conditions.

Progress to Date:

Two seasons of field research have been completed. The field data collected include hydrologic, geomorphic, and vegetative conditions at 20 sites distributed throughout the watershed. Watershed based GIS development is nearly completed. Multi-spectral videographic overflight data have been compiled, analyzed, and entered into the GIS. Historic change maps from aerial photographs currently are being developed. Two publications in *Restoration Ecology*, are forthcoming from the work completed in this project and are part of a special issue of *Restoration Ecology* focusing on riparian wetlands. Two conference/workshop presentations have been delivered based upon research conducted on this project. The first presentation was part of a special workshop for EPA personnel in the Denver Regional Office. The presentation focused on techniques of watershed

modeling and historic reconstruction of streams and riparian corridors. The second presentation part of a special conference organized around projects being conducted in the Upper Arkansas River Basin.

Future Plans:

Final field work will be completed during summer 1995. Historic analysis of stream and riparian conditions will be completed by fall 1995. Analysis of relationships between hydrologic, geomorphic, and vegetative conditions from field surveys should be completed by spring 1996. Two M.S. Theses and one Ph.D. Dissertation will be produced from this research effort.

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Inquiry-Based Environmental Education Workshops for Educators

Collaborating Agency(ies): USDA/Forest Service

Project Location: Various Sites in Northern Utah

Project Duration: September 1993 - September 1995

Investigators: Sharon Ohlhorst

Goals and Objectives:

To provide a variety of hands-on inquiry-based inservice education workshops for teachers. The workshops (six total) involved a variety of aspects of natural resource science as well as the basics of inquiry-based student-centered education. Evaluations and follow-up materials indicate that the workshops were very successful at that more ecology is being taught by these teachers.

Workshops sponsored include:

- 25 September 1993 (3 hours, WSU/NASA teacher workshop at Weber State)
- 19 February 1994 (10 hours, inservice for Deseret News insert on schoolyard ecology)
- 6-10 June 1994 (5-day residential workshop - Logan Canyon Teachers Workshop)
- 25-26 July 1994 (2-day "Keepers of the Earth" Workshop)
- 3 March 1995 (Hardware Ranch Ecology Workshop)
- 12-14 June 1995 (3-day Logan Canyon Teachers Workshop)

U.S. Forest Service/USU Challenge Cost-Share Agreement Long Term Effect of Irrigation Diversions

Collaborating Agency(ies): USDA/Forest Service

Project Location: Uinta Mountains/Utah State University

Project Duration: September 1993 - December 1995

Investigators: John Schmidt

Technicians: Mark Smelser, Spencer Logan

Goals and Objectives:

The Forest Service and USU have established this agreement to evaluate the use of historical data in reconstructing the evolution of stream channel characteristics of the National Forests since the initiation of water development activities approximately 100 years ago. USU will investigate techniques that can be used to quantify historical changes in stream channels directly affected by stream diversions in the Uinta Mountains and surrounding areas of Utah. The techniques and methodologies developed by USU will be used by the Forest Service in its evaluation of the role of discharge in maintaining channel size and other characteristics of its streams.

The goal is to seek out the most significant changes that can be readily identified and documented with photos and other illustrations. To the degree practicable, determine quantitatively the changes in the flow regime responsible for the observed changes. The report will illustrate changes observed on a variety of situations regarding geography, proportions of diversion, length of time diversion has been in place, and operating schedules of diversion.

Relationships Among Landscape Patterns, Divergence Time and Measures of Population Genetic Structure and Variability

Collaborating Agency(ies): USDA/Forest Service

Project Location: Uinta Mountain Range, northeastern Utah.

Project Duration: June 1993 - February 1995

Investigators: David Winn
Paul Wolf
Thomas Edwards

Technicians: David Perault

Goals and Objectives:

The goal of this study was to assess the geographic structure of genetic variation in chipmunks (*Eutamias spp.*) across a montane ecosystem.

Progress to Date:

Final report submitted December 1994.

Program to Date:

A package National Environmental Database (NED) has been constructed for the ANS, ANFO and ANS and partially populated with biological data provided by various federal and state agencies. The database is hierarchical and allows the user to move through data system of the national, state, and regional, and institutional levels. One of the main goals of the project was to develop a database for the National Guard Training Area (NAT) and Camp Palfrey (Munich) and Camp Williams (Utah). The remaining National Guard installations across the United States and Alaska, and any data they have in Utah State University (USU) to be updated by 1995.

Future Plans:

Currently the USU team is developing an ArcView 2.1 interface for use with the data from individual institutions. The phase of the project will eventually provide data installation with a CD-ROM data package (to be updated yearly) that can be used on any PC with Windows 3.1 and a CD-ROM reader. Included in this package will be an interface to the National Guard's Land Condition Trend Analysis (LCTA) data which will then be integrated with the other

Report on the Study of the Effects of the Proposed Project on the Environment

1. Introduction

2. Objectives

3. Methodology

4. Results

5. Discussion

6. Conclusion

7. References

8. Appendix

9. Glossary

10. Index

11. Acknowledgements

12. Summary

13. Executive Summary

14. Introduction

The purpose of this study is to assess the potential impacts of the proposed project on the environment. The study was conducted in accordance with the following objectives:

15. Objectives

16. Methodology

Research and Development of a Nation-Wide Decision Support System Using GIS/Remote Sensing

Collaborating Agency(ies): Department of Defense-National Guard Bureau

Project Location: Utah State University & National Guard Training Sites

Project Duration: August 1993 - September 1997

Investigators: Allan Falconer, R. Douglas Ramsey, David Roberts

Project Leader: Eric Olsen

Technicians: Brian Biggs, Merland Halisky, Kimberly Patraw, Richard Spencer

Goals and Objectives:

The goal for this project is to build a GIS database for the National Guard Bureau Environmental Office (NGB-ARE) and Operations Office (NGB-ARO). This database will consist of several data layers, including environment (e.g. vegetation, topography), facilities (e.g. roads, buildings), and operations areas (e.g. ranges). It will provide environmental and operations managers with geographically integrated data which they can use to help make informed decisions in the management of their areas.

Progress to Date:

A prototype National Environmental Database (NED) has been constructed (in the ARC/INFO GIS system) and partially populated with biophysical data produced by various federal and state agencies. The database is hierarchical and allows the user to move through data layers at the national, state, eco-region, and installation levels. Data at the installation level has been compiled primarily for Orchard Training Area (Idaho), Camp Ripley (Minnesota), and Camp Williams (Utah). The remaining National Guard installations across the United States have been directed to send any data they have to Utah State University (USU) to be entered into NED.

Future Plans:

Currently the USU team is concentrating on developing an ArcView 2.1 interface for use with the data from individual installations. This phase of the project will eventually provide each installation with a CD-ROM data package (to be updated yearly) that can be used on any PC with Windows 3.1 and a CD-ROM reader. Included in this package will be an interface to the National Guard's Land Condition Trend Analysis (LCTA) data which will then be integrated with the various

Development and Improvement of a National System of Higher Education

The purpose of this study is to examine the development and improvement of a national system of higher education. The study is based on a review of the literature and a survey of the current state of higher education in the United States. The study is organized into four main sections: (1) a review of the literature, (2) a survey of the current state of higher education, (3) a discussion of the development and improvement of a national system of higher education, and (4) a conclusion.

The first section of the study is a review of the literature. This section examines the various theories and models of higher education that have been developed over the years. It also examines the various factors that have influenced the development of higher education, such as the economy, the culture, and the government. The second section of the study is a survey of the current state of higher education in the United States. This section examines the various aspects of higher education, such as the quality of the education, the cost of the education, and the access to the education.

The third section of the study is a discussion of the development and improvement of a national system of higher education. This section examines the various factors that have influenced the development of higher education, such as the economy, the culture, and the government. It also examines the various models of higher education that have been developed over the years. The fourth section of the study is a conclusion. This section summarizes the findings of the study and discusses the implications of the findings for the development and improvement of a national system of higher education.

The study concludes that the development and improvement of a national system of higher education is a complex task that requires the cooperation of all stakeholders. It also concludes that the development and improvement of a national system of higher education is a long-term process that requires ongoing effort and resources. The study also concludes that the development and improvement of a national system of higher education is a task that requires the cooperation of all stakeholders.

installation data layers on the CD; this will allow the Environmental Office to better evaluate the health and trend of the installation ecosystems.

Project Objectives

Project Location

Project Duration

Project Staff

Project Budget

Goals and Objectives

The project was designed and implemented to provide a comprehensive assessment of the health and trend of the installation ecosystems. The project was designed to provide a comprehensive assessment of the health and trend of the installation ecosystems. The project was designed to provide a comprehensive assessment of the health and trend of the installation ecosystems. The project was designed to provide a comprehensive assessment of the health and trend of the installation ecosystems.

Project Results

Phase 1, the design and implementation of the project design, including database design and model development, is complete.

Phase 2, the development of the initial GIS database, is complete and data was imported by the USCA/USDA Service Area Data Management System. A map of the Service Area was provided to the USCA/USDA Service Area Data Management System. A map of the Service Area was provided to the USCA/USDA Service Area Data Management System. A map of the Service Area was provided to the USCA/USDA Service Area Data Management System.

Phase 3, field data collection, was completed in a timely and efficient manner. A map of the Service Area was provided to the USCA/USDA Service Area Data Management System. A map of the Service Area was provided to the USCA/USDA Service Area Data Management System.

Phase 4, data analysis of each field station, is complete and data was imported by the USCA/USDA Service Area Data Management System. A map of the Service Area was provided to the USCA/USDA Service Area Data Management System. A map of the Service Area was provided to the USCA/USDA Service Area Data Management System.

Phase 5, data presentation, included the maps of the Service Area and the maps of the Service Area. A map of the Service Area was provided to the USCA/USDA Service Area Data Management System. A map of the Service Area was provided to the USCA/USDA Service Area Data Management System.

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Enclosed for the Department of the Interior are two copies of the Environmental Impact Statement for the proposed project. The Department of the Interior is requested to review the statement and provide comments to the Department of the Army by the date indicated on the cover sheet.

Very truly yours,
[Signature]

Shoshone Ecological Survey Project

Collaborating Agency(ies): USDA/Forest Service

Project Location: Shoshone National Forest/Utah State University

Project Duration: August 1992 - April 1996

Investigators: Allan Falconer, R. Douglas Ramsey, David Roberts

Technicians: Doug Wight, Nathan Bentley

Goals and Objectives:

The project uses GIS and remote sensing technology to assist in the development of ecological units based on soil forming factors. By combining the results of spatial modelling with field data collection, and resource inventory data, the forest planners and managers are able to distribute soil sampling sites more efficiently, create maps of individual ranger districts on demand and review a variety of maps and models of variables important in decision taking.

Progress to Date:

Phase 1, the design and implementation of the project design, including database design and model selection, is complete.

Phase 2, the compilation of an initial GIS database, is complete and data sets supplied by the USDA/Forest Service have been incorporated as requested. Copies of the database have been provided to the Shoshone National Forest in electronic form as requested. A state geology map of Wyoming was digitized and entered into the system along with STATSCO soils map. New data are continually being added to the soils database as each season's field study is completed.

Phase 3, field data collection based on a sample site distribution model developed at Utah State University, is proceeding under Forest Service supervision each field season.

Phase 4, data analysis of each field season's field data, is proceeding and provides predictive models of natural vegetation, current vegetation and soil classification each year. The model used is a correlation and regression tree classifier that provides both decision rules for classification and a statement of uncertainty at each point.

Phase 5, map production, included the maps of predicted vegetation cover or soils noted in 4 above. Sets of maps for a variety of applications have been delivered both for the forest as a whole and for specific ranger districts.

Phase 6, GIS and database delivery and training, has proceeded with some delays caused by changes in the commercially available software. The database is now available in ArcView 2.0 format and has been delivered and installed on USDA-FS computers in Cody WY.

Phase 7, sample plan design based on predicted soil types (as modeled) and the accuracy/uncertainty of the prediction, has proceeded by creating maps of soil polygons and distributing sample sites in relation to the needs based on the certainty of the prediction. This provides the USDA-FS with a series of polygons and a sampling priority that permits the efficient preparation of soil sampling contracts.

Overall the database is established, new data layers have been created and soil sampling plans developed. Models of soil type are being used to increase the reliability and efficiency of soil sampling. Products have been delivered as requested and new data sets are added as each seasonal data collection activity is completed.

Geographic Information Systems for Water Quality

Collaborating Agency(ies):	Environmental Protection Agency Utah Dept. of Agriculture Utah Dept. of Public Health USU Extension Service
Project Location:	Chalk Creek, Otter Creek, Beaver River and Little Bear River Watersheds.
Project Duration:	1995-1997
Investigators:	Michael P. O'Neill R. Douglas Ramsey Christopher M.U. Neale Charles W. Gay
Graduate Students & Technicians:	1 Full-Time Graduate Student 1 Part-Time GIS Technician

Goals and Objectives:

The goal of this project is to develop accurate Geographic Information Systems that can be used to (1) assist in the development of water quality management projects, (2) improve educational programs through more accurate information on watershed processes, and (3) coordinate data resources with on-going monitoring programs within these watersheds.

For each of the four watersheds, this project integrates multi-spectral videography overflights with historic aerial photographs of the stream and riparian corridor and field surveys of stream and riparian conditions to provide information concerning the condition and historic changes in the nature and distribution of riparian vegetation. The project also attempts to determine how the current distribution of riparian vegetation has been affected or developed by natural (hydrologic and/or geomorphic) events.

This project will produce historic change maps of stream and riparian conditions, analyses of hydrologic and geomorphic conditions within each of the watersheds, and linkages between historic conditions and current status of stream and riparian conditions. Where available, existing data from monitoring groups will be incorporated into the GIS.

Information from this project will be provided to the funding agencies as well as landowners, resource user groups, and agency personnel involved in the various watersheds.

Progress to Date:

Signed contracts for this project now are pending and work should begin in July, 1995.

Geographic Information Systems for Forest Inventory

1. Introduction	1.1. Background
2. Objectives	2.1. General Objectives
3. Methodology	3.1. Data Collection
4. Results	4.1. Data Analysis
5. Conclusions	5.1. Summary
6. References	6.1. Bibliography
7. Appendix	7.1. Maps
8. Glossary	8.1. Definitions
9. Acknowledgements	9.1. Credits
10. Bibliography	10.1. References

The purpose of this report is to provide a comprehensive overview of the current state of Geographic Information Systems (GIS) for forest inventory. The report is organized into ten chapters, each covering a specific aspect of the topic. Chapter 1, 'Introduction', provides a general overview of the field. Chapter 2, 'Objectives', outlines the goals of the study. Chapter 3, 'Methodology', describes the data collection and analysis methods. Chapter 4, 'Results', presents the findings of the study. Chapter 5, 'Conclusions', summarizes the main points. Chapter 6, 'References', lists the sources used. Chapter 7, 'Appendix', contains maps and other supplementary material. Chapter 8, 'Glossary', defines key terms. Chapter 9, 'Acknowledgements', thanks those who assisted in the work. Chapter 10, 'Bibliography', provides a list of references.

Future Plans:

This project will begin videography overflights of the four watersheds in August, 1995. Historic photographs of the four watersheds have been researched and will be ordered when contracts are finalized. Initial field surveys of stream and riparian conditions will be conducted during late summer, 1995 and GIS development will begin during the fall, 1995.

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The system will have temporary facilities in the amount of \$100,000
to meet the needs of the new students and to be able to
provide the facilities for the new students and to be able to
provide the facilities for the new students and to be able to

These Plans
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Geographic Information Systems for Water Quality: An Example from Otter Creek, Utah

Michael O'Neill, Ph.D., Frank Dougher, and Verl Bagley, Utah State University.

Geographic Information Systems (GIS) are powerful tools for management, analysis, and display of spatial data. We have developed a GIS for the Otter Creek Watershed to relate a variety of geographic information to selected water quality parameters monitored within the watershed. Our analyses consider data from three spatial scales. The first spatial scale includes data that provide complete coverage of the entire watershed. The second spatial scale presents data consistent with reach analyses and the final spatial scale includes detailed information collected at the field site scale.

At the watershed scale, spatial resolution is relatively coarse and data are used to provide a general overview of the watershed. We are using Digital Elevation Model data (30 meter spatial resolution, 1 meter vertical resolution) to represent topography within the watershed. Derived indices such as slope, aspect, and relative wetness also can be constructed for this spatial scale. We also include Landsat TM data (30 meter resolution), available through the GAP Analysis Project, at this scale to characterize vegetation throughout the watershed. Land ownership data at the watershed scale (Federal, State, and Private) also is available from the GAP Project (30 meter resolution).

At present, we have two existing sets of reach scale data for the Otter Creek Watershed. The first set includes longitudinal profile data of the main stream corridor and digitized planimetric data of the stream channel. These data were collected by digitizing stream lines and contour crossings from USGS 1:24,000 scale topographic maps. Also, at the reach scale, we are using historic aerial photographs to characterize the stream and riparian corridor. These photographs allow us to determine the nature and extent of change occurring in the stream and/or riparian system. The aerial photographs are digitally scanned and then geo-rectified to match coordinates in data sets at the watershed scale. Overlapping images then are stitched together to form continuous strips of photographic imagery.

Finally, specific field site data also have been included in the GIS. These data generally represent topographic field surveys of the channel and adjacent floodplain or monitoring points for data collection such as gaging stations or water quality project sites. Where possible, stream channel cross-sections are rectified to existing imagery (at the reach scale). Alternatively, a Global Positioning System (GPS) can be used to rectify known benchmarks or site markers at the field site to coordinates at the reach or watershed scale. In addition to topographic data, specific data relating to vegetation at field sites can be included. Oblique photographs of field sites or photo transect points also can be identified within the GIS and included as a separate data layer. These photographs can be used to track changes in vegetation, channel conditions, or progress of water quality projects.

In the future, we intend to incorporate multi-spectral videographic images of the main stream and riparian corridor into the GIS. These data will provide us with accurate vegetative assessment at the reach scale and supplement our characterization of physical stream conditions. Additionally, we intend to expand the number of surveyed stream cross-sections presently included in the field site evaluation.

Extension Non-Point Source Water Quality Projects

Collaborating Agency(ies): U.S. Department of Agriculture

Project Locations: Cache County (Little Bear River Hydrologic Unit)
Piute County (Otter Creek/Koosharem Hydrologic Unit)

Project Duration: Phase I
1989-1994 Cache County
1990-1995 Piute County
Phase II
1994-1997 Cache County
1995-1998 Piute County

Investigators: Charles W. Gay
Michael O'Neill
Michael Allred
Verl Bagley

Technicians & Graduate Students: 1 Full-Time Graduate Student
1 Part-Time Technician

Goals and Objectives:

The goal of these two projects is to provide information and education (I&E) programs for a wide variety of audiences representing private landowners and resource users, Federal, State, and Local agency or government personnel, and other individuals or user groups active within the selected watersheds. Educational programs target a variety of audiences including schools (K-12), youth groups (4H, Boy Scouts, etc...), landowners, and local government officials. Information programs are used as a support base to the educational efforts.

Progress to Date:

During the most recent fiscal year, the Little Bear River HUA Project sponsored or organized over ten workshops for agency personnel, landowners, and recreationists to learn about water quality issues within the basin. Three field tours (Interagency, landowners, public) also were conducted in the project area. These tours are aimed at demonstrating success of water quality projects and encouraging landowners to participate in water quality programs. A quarterly newsletter describing Best Management Practices (BMPs) being implemented within the basin also has been developed and distributed to landowners in the watershed. Approximately 100 landowners have participated in the water quality program because of the strong information and education program developed in this project.

A large number of school (K-12) educational programs on water quality have been presented throughout Cache County and the State by Mike Allred representing the Little Bear River HUA. These programs have had a substantial impact on youth awareness of water quality issues and watershed processes. Other educational programs for youth groups (4H and Boy Scouts) have shown similar success.

Computer simulations using the EPIC model for soil erosion have been conducted for a wide spectrum of conditions similar to those found within the Little Bear River watershed. Results of these simulations now are being used to improve land management strategies for reduction of soil loss in agricultural areas. A historic reconstruction of stream and riparian conditions also is under way for the Little Bear River. This reconstruction will integrate hydrologic and geomorphic events to further investigate causes of stream and water quality degradation. The historic reconstruction will be developed in the Remote Sensing and Geographic Information System Laboratory (RS & GIS Lab) at Utah State University.

The Otter Creek HUA Project also has developed a quarterly newsletter detailing BMPs and land treatments ongoing within the basin. Because of the success of the Otter Creek I&E program, a high percentage of landowners have agreed to participate in the NPS water quality program. Likewise, several youth education programs have been implemented through this project. These programs focus on water quality issues and highlight the need for implementation of BMPs within the Otter Creek drainage.

Through the I&E program, a private landowner was convinced to cooperate with the Bureau of Land Management to implement a major vegetation conversion program on Federal land. This project involved cooperation of the Utah Non-Point Source Task Force (made up of several State and Federal Agencies), the landowner, BLM, and the U.S. EPA to convert several hundred acres of sagebrush to a higher forage production grass/sage mixture. An information project has been established in the area of this vegetation conversion to track sediment yield from the converted surfaces.

As part of the I&E program, a watershed based GIS for Otter Creek has been developed. This GIS incorporates watershed based data on topography and land cover, historic aerial photographs of the main channel and riparian corridor, and field site data from surveys and monitoring programs. The GIS will enhance management decisions by providing better information on the physical conditions and changes that have occurred within the watershed.

Future Plans:

We hope to expand the impact of I&E programs developed for these two watersheds to extend beyond the basin limits. Mike Allred from the Little Bear River project has already begun to develop I&E programs for the Bear River Basin based upon experience developed in the Little Bear River Project. Likewise, efforts under way in the Otter Creek watershed will be shared with work groups forming in nearby watersheds.

Extension Non-Point Source Information & Education Projects

Collaborating Agency(ies): Environmental Protection Agency
Utah Dept. of Agriculture
Utah Dept. of Environmental Quality
USU Extension Service

Project Locations: Summit County (Chalk Creek Watershed)
Beaver County (Beaver River Watershed)

Project Duration: 1994-1996 Summit County
1995-1997 Beaver County

Investigators: Charles W. Gay
Michael P. O'Neill
Sterling Banks

Graduate Students & Technicians: 1 Part-Time Technician

Goals and Objectives:

The goal of these two projects is to provide educational programs that incorporate accurate and up-to-date information concerning water quality issues within these two watersheds. Information programs are focused on development of accurate chronologies of stream and riparian changes and linkages between

Provide landowners with information about linkages between management and water quality.

Progress to Date:

In the Chalk Creek Watershed Project, three field tours have been scheduled for summer and fall 1995. The first tour will provide an opportunity for agency personnel to become familiar with water quality issues within the watershed. The second tour will be restricted to local landowners and resource users. This tour will allow landowners, the County Agent, and local NRCS personnel to discuss merits and difficulties of the US EPA 319 water quality program while touring active and planned projects within the Chalk Creek Watershed. Additionally, news articles describing the project have appeared in the local newspaper.

The Technical Advisory Committee (TAC) for the Beaver River Watershed Project is being formed. Members of the TAC will include Extension Specialists in Watershed/GIS, and Animal Waste, the County Extension Agent, and representatives from the Soil

Conservation District (SCD), Natural Resources Conservation Service (NRCS), and other State and Federal Agencies.

Future Plans:

For the Chalk Creek Watershed Project, a watershed newsletter is in development and should be available in July, 1995. Also, we intend to utilize information from historic photograph analyses and Geographic Information System (developed in other projects) to advance our information base for future educational materials.

The Beaver River I&E Program has just been initiated. Future plans include development of tours, educational programs, newsletters, newspaper articles, and other informational materials for the project.

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1. The first of the two main points of the report is that the Government should take steps to improve the position of the working class.

2. The second point is that the Government should take steps to improve the position of the middle class.

3. The third point is that the Government should take steps to improve the position of the upper class.

Hydrologic, Geomorphic and Anthropogenic Impacts on Stream and Riparian Conditions

Collaborating Agency(ies): Environmental Protection Agency
Utah Dept. of Agriculture
Utah Dept. of Environmental Quality
USU Extension Service

Project Location: Chalk Creek Watershed

Project Duration: 1995-1996

Investigators: Michael P. O'Neill
Joanna Endter-Wada
Charles W. Gay

Technicians: 1 Full-Time Graduate Student

Goals and Objectives:

The goal of this project is to identify and/or establish linkages between land management strategies and stream or riparian condition within the Chalk Creek Watershed. We have two basic objectives associated with this project. The first objective is to relate physical conditions (flood hydrology and geomorphology) to development of recognized riparian stands within the watershed.

The second objective is to determine how land management affects the distribution and/or composition of riparian vegetation within the watershed.

Progress to Date:

This project has been approved but signed contracts are not yet available. Work should begin in July, 1995.

Future Plans:

Field work should begin during summer, 1995. As a first step, similar age stands of cottonwood trees will be identified and tree cores will be extracted to determine ages of these stands. Topographic surveys then will be conducted to link the position (spatial and vertical) of these cottonwood stands to current stream elevation and location. Next, historic flow records and aerial photographs will be analyzed to determine the hydrologic event or series of events responsible for establishment of selected cottonwood stands. Finally, an attempt will be made to determine how, if at all, land management strategies have impacted the ability of cottonwood trees to regenerate within the Chalk Creek Watershed.

Geographic Information Systems and Remote Sensing

Geographic Information Systems (GIS) and Remote Sensing are two of the most powerful tools available for the study of the Earth's surface. They allow us to collect, store, analyze, and display spatial data in a way that is both efficient and effective.

Remote Sensing is the process of obtaining information about the Earth's surface without making direct contact with the object being studied. This is typically done using satellite imagery or aerial photography.

GIS is a computer-based system that allows us to store, analyze, and display spatial data. It typically consists of a database, a set of software tools, and a user interface.

Together, GIS and Remote Sensing provide a powerful means for studying the Earth's surface and its changes over time.

One of the most important applications of GIS and Remote Sensing is in the field of environmental management. By using these tools, we can monitor changes in land use, deforestation, and other environmental factors. This information can then be used to develop policies and programs to protect the environment.

Another important application of GIS and Remote Sensing is in the field of urban planning. By using these tools, we can monitor changes in urban development and infrastructure. This information can then be used to develop policies and programs to improve urban planning.

GIS and Remote Sensing are also used in a wide variety of other applications, including agriculture, forestry, and geology. In agriculture, for example, GIS and Remote Sensing can be used to monitor crop health and yields. In forestry, they can be used to monitor deforestation and forest health. In geology, they can be used to monitor geological hazards and resource distribution.

**Landscape Ecology Modeling and Analysis Center
Remote Sensing/Geographic Information System,
and
Other Natural Resources-Related Programs**

Collaborating Agency(ies): Bureau of Land Management

Project Location: Nation Wide (primary focus western public land states)

Project Duration: August 1993 - September 1998

Investigators: Joseph Chapman
Allan Falconer
Craig Altop

Goals and Objectives:

The main objectives are to develop scientific and modern technological tools that have on-the-ground management applications for ecosystems and landscapes, provide technical assistance, training, liaison and technology transfer services for agencies and organizations involved in natural resource management. Facilitate collaborative projects between agencies and organizations to accomplish management objectives at the ecosystem level. Provide technical support and advise as an ongoing function. Provide training for field personnel, assist in development of ecosystem management strategies, and assist in development and implementation of practical and cost effective monitoring and inventory techniques for natural and cultural resources. Provide a linkage between researchers and on-the-ground natural resource practitioners.

Progress to Date:

Facilitation of a major collaborative project involving the Hill Air Force Base, BLM and scientists at Utah State University to assess threatened, endangered, sensitive and special status species, develop an environmental data base for ecosystem management has been successful. The ongoing project will provide data necessary to manage both Air Force and BLM administered lands in the West Desert of Utah. A major MOU was developed and signed that creates an Interagency Natural Resources and Environmental Analysis and Synthesis Center at Logan. The MOU will foster increased sharing of scarce resources and provide new avenues for collaboration between agencies, organizations and scientists. In collaboration with the NBS GAP program, mapping and evaluation of riparian areas for the state of Nevada is being accomplished. These data will be made available to field managers for use in day-to-day management of rangeland and riparian resources. Methodology using

Environmental Policy Statement and Environmental Management Program

Environmental Policy Statement	Approved by Board of Directors
Environmental Management Program	Approved by Board of Directors
Environmental Policy Statement	Approved by Board of Directors
Environmental Management Program	Approved by Board of Directors
Environmental Policy Statement	Approved by Board of Directors
Environmental Management Program	Approved by Board of Directors

Environmental Policy Statement and Environmental Management Program

The purpose of this document is to establish a clear and concise statement of the company's environmental policy and to provide a framework for the development and implementation of an environmental management program. The policy statement is a commitment to the protection of the environment and the health and safety of the community. It is a statement of the company's values and its commitment to the highest standards of environmental performance. The management program is a set of procedures and processes that are designed to ensure that the company's environmental policy is implemented and that the company's environmental performance is continuously improved. The management program is a key component of the company's overall management system and is essential for the achievement of the company's environmental goals.

The management program is a key component of the company's overall management system and is essential for the achievement of the company's environmental goals. The management program is a set of procedures and processes that are designed to ensure that the company's environmental policy is implemented and that the company's environmental performance is continuously improved. The management program is a key component of the company's overall management system and is essential for the achievement of the company's environmental goals. The management program is a set of procedures and processes that are designed to ensure that the company's environmental policy is implemented and that the company's environmental performance is continuously improved. The management program is a key component of the company's overall management system and is essential for the achievement of the company's environmental goals.

image processing software is being developed to assist in quantification of instream microhabitats and riparian habitats using historic and current aerial photography for anadromous fish streams in Alaska. Interim results have been released to field offices to assist in ongoing management. Software and technology developed by Ducks Unlimited and BLM is being maintained and distributed by LEMAC. Training for field offices is provided by LEMAC in use of the software and techniques for optimal use of field data and imagery to map waterfowl habitat. Training in monitoring design, and evaluation for BLM field offices and other agency personnel has been provided as part of a course in management for biodiversity. As part of a multi disciplinary team, developing methods and techniques to assess and monitor rangeland ecosystem health in the west using state-of-the-art science and technology is ongoing. Acted as liaison between BLM and industry to facilitate continued mapping and evaluation of arctic habitats in Alaska.

Future Plans:

Facilitation of collaborative efforts between agencies, organizations and academic institutions will continue at an increased level to take advantage of scarce skills and limited funding. Increasing demands for synthesis of data, training in new techniques, and development of custom applications for ecosystem management will generate many prototype projects for ecosystem management applications. The Ducks Unlimited software will be upgraded to stay current with releases of the image processing software for which it was developed. Landscape analysis tools and training field personnel in the use and interpretation of these tools will be an ongoing process. Waterfowl habitat mapping and evaluation on a flyway basis, linked with distribution and migration studies using the DU software, landscape analysis software, and population models is planned.

Natural Resources and Environmental Policy Program

Collaborating Agency(ies):	College of Natural Resources and the College of Humanities, Arts, and Social Sciences at Utah State University
Program Location:	Utah State University
Program Duration:	Initiated in 1991, this is now an ongoing program
Director:	Joanna Endter-Wada
Participating Colleges:	All eight colleges at USU participate in this program (Agriculture; Business; Education; Engineering; Family Life; Humanities, Arts and Social Sciences; Natural Resources; and Science)
Participating Departments:	Sixteen departments at USU participate in this program (Agricultural Systems Technology & Education; Biological and Irrigation Engineering; Business Administration; Civil and Environmental Engineering; Economics; Fisheries and Wildlife; Forest Resources; Geography and Earth Resources; History; Landscape Architecture and Environmental Planning; Management and Human Resources; Political Science; Rangeland Resources; Sociology, Social Work and Anthropology; and Watershed Science)

Goals and Objectives:

The Natural Resources and Environmental Policy Program is an interdisciplinary program designed to respond to the increasing conflicts and challenges our society faces in developing public policies and management strategies for dealing with natural resources and the environment. Addressing today's complex natural resources and environmental issues requires integrating knowledge from the social and the natural sciences. Developing better mechanisms for facilitating public involvement in decision-making and for managing conflicts over natural resources are also required. The Natural Resources and Environmental Policy Program fosters interdisciplinary education and research to provide better understanding of contemporary natural

resources and environmental problems and to stimulate the search for innovative, creative, and feasible solutions to those problems.

Program Activities:

The program offers a Graduate Certificate in Natural Resources and Environmental Policy, which is unique within the Utah system of higher education. Graduate students at Utah State University may earn this certificate to enhance their disciplinary training by taking additional course work and giving a public lecture on the policy dimensions of their thesis. The program sponsors an evening seminar series featuring renowned, invited speakers who address a variety of natural resources and environmental issues. The program also promotes interdisciplinary and collaborative research among faculty.

A socio-cultural effects model for ecosystem management on the Dixie National Forest

Collaborating Agency(ies): U.S.D.A. Forest Service, Rocky Mountain Experiment Station

Project location: Dixie National Forest, Utah

Project duration: October 1994-September 1996

Investigators: Dale J. Blahna
Richard S. Krannich

Technicians: Michael Roloff
Mark Sullivan

Goals and objectives:

Develop management guidelines for applying social impact assessment techniques to evaluate the social effects of ecosystem management projects, and to identify the community and organization benefits of recreation and esthetics as an input for evaluating the social effects of ecosystem management on the Dixie National Forest.

Progress to Date:

Conducted a review of social assessment and ecosystem management literature and compiled annotated bibliography of citations. We also developed a conceptual model for conducting social effects analysis within a resource planning framework. The model is designed for including social assessment at various scales of ecosystem management decisions ranging from watershed to forest-wide planning, and for integrating public involvement in the broader social assessment process.

Future Plans:

We will test and refine certain aspects of the conceptual model. The first task will be to identify local geographical communities and local, regional, and national "communities of interest." These are groups that have a stake (social, psychological, or economic) in forest ecosystem management decisions on the Dixie. During 1996 the focus of the project will be identifying and evaluating specific linkage variables that influence the social effects of management decisions, and developing techniques for displaying results for policy and decision making. The focus will be on identifying off-site, community resident-based effects, rather than on-site, visitor-based effects of decisions.

Social Impacts and Management of Llamas as Recreational Packstock

Collaborating Agency(ies): Aldo Leopold Wilderness Research Institute

Project location: Yellowstone National Park and Teton National Forest

Project duration: May 1993-October 1994

Investigators: Dale J. Blahna

Technicians: Kari Smith

Goals and objectives:

Conduct an on-site and a follow up mail survey of backcountry visitors' attitudes toward the use of llamas as recreational packstock. Two study sites were selected: one represented an area with heavy use by local residents and had a high level of packstock use (Jedediah Smith Wilderness on the Targhee National Forest), and one site was more of a destination tourism, backpacking area (Bechler Meadow in Yellowstone National Park). Survey items included visitor contact and carrying capacity questions (including contacts with llamas), general attitudes toward llamas, perception of acceptability of other visitors using llamas in the backcountry, and the role of llamas in the asymmetrical hiker-packstock conflict debate.

Progress to Date:

The on site surveys were conducted during the summer and fall of 1993 and follow up mail surveys were completed during the winter of 1993-94. We received a total of 337 useable responses to the mail survey (including 182 responses from the Bechler subsample and 155 from Jedediah Smith), which represented a 78% response rate. Computer input and preliminary analyses have been completed, and preliminary results were presented at a national conference in the spring of 1994. The full report of the results is still in progress.

Future Plans:

Complete the report of final results and submit paper for publication to special edition of Leisure Science focussing on recreation conflict. Results will also be used to compare with the perceptions of wilderness managers towards llama use from a 1995 survey conducted by scientists at the Aldo Leopold Wilderness Research Institute.

Social Impact and Management of Forests in Environmental Impact

Collaborating Agencies	U.S. Forest Service, National Forest Service
Project Location	Yellowstone National Park and the National Forest
Project Duration	May 1961 - October 1964
Investigator	Don J. Brown
Techniques	Map Study

Summary of the project and its results, including a list of the project's objectives and a brief description of the methods used.

Forest and Wildlife
The project was conducted during the summer and fall of 1961 and followed up with a survey of the area in the spring of 1962. The project was designed to determine the impact of the National Forest Service's management plan on the forest and wildlife resources of the area. The project was conducted in the National Forest and the National Park. The project was designed to determine the impact of the National Forest Service's management plan on the forest and wildlife resources of the area. The project was conducted in the National Forest and the National Park. The project was designed to determine the impact of the National Forest Service's management plan on the forest and wildlife resources of the area.

Project in Detail
The project was conducted during the summer and fall of 1961 and followed up with a survey of the area in the spring of 1962. The project was designed to determine the impact of the National Forest Service's management plan on the forest and wildlife resources of the area. The project was conducted in the National Forest and the National Park. The project was designed to determine the impact of the National Forest Service's management plan on the forest and wildlife resources of the area.

Forest Impact
The project was designed to determine the impact of the National Forest Service's management plan on the forest and wildlife resources of the area. The project was conducted in the National Forest and the National Park. The project was designed to determine the impact of the National Forest Service's management plan on the forest and wildlife resources of the area.

Moab Slickrock Trail Mountain Bike Study

Collaborating Agency(ies): U.S.D.A. Forest Service (Southwest Forest Experiment Station), Bureau of Land Management (Moab District Office), and State of Utah (Mineral Lease Funds)

Project location: Moab, Utah

Project duration: August 1993-April 1995

Investigators: Dale J. Blahna
Russ Von Koch
Deborah Chavez

Technicians: Jim Vilter
Susan Van Patten
Doug Reiter
Todd Thorn

Goals and objectives:

Investigate mountain biker attitudes and behavior and the impacts of mountain biking on local communities in Southeastern Utah. Conduct a questionnaire of mountain bikers and local community residents in and around Moab. Survey questions were designed to investigate visitors' background and biking behavior characteristics, perceptions of resource and visitor management problems, resource management and facility preferences, perceptions of effective communication strategies, and willingness to pay for funding resource management activities. Conduct a survey of local residents' attitudes toward mountain biking and tourism in general.

Progress to Date:

Two surveys have been conducted and a third is in progress. The first was a random sample of 579 bikers using the Slickrock Trail during the spring, summer, and fall of 1993. The second survey was a sample of 624 mountain bikers that live in or passed through Moab during the fall of 1994. The final survey, which is currently in progress, is a random sample of 300 local Moab residents. The final report for the first survey has been completed and there have been four conference papers presented and one journal article submitted for review. There has been one conference paper presenting the results of phase two and the final results are currently in draft form. We are still collecting the data for phase three.

Future Plans:

We need to complete the data collection for phase three. We anticipate a joint publication of the results of all three phases as an Experiment Station General Technical Report through the Forest Service Southwest Forest Experiment Station.

Chapter 1: The General Principles

1.1.1. The purpose of this document is to provide a general overview of the principles governing the operation of the system. It is intended to serve as a guide for the development and implementation of the system, and to ensure that all components are designed and built in accordance with the same principles.

1.1.2. The principles are based on the following assumptions:

1.1.2.1. The system is designed to be flexible and adaptable to changing requirements.

1.1.2.2. The system is designed to be efficient and to use resources effectively.

1.1.2.3. The system is designed to be secure and to protect data from unauthorized access.

1.1.2.4. The system is designed to be reliable and to provide consistent results.

1.2. The System Architecture

The system architecture is based on the principles of modularity and scalability. The system is designed to be composed of a number of modules, each of which performs a specific function. The modules are designed to be independent of each other, so that they can be developed and tested separately. This allows for the system to be built in a modular fashion, and to be scaled up or down as required. The architecture is also designed to be flexible, so that it can be adapted to different environments and requirements.

1.3. The System Implementation

The system implementation is based on the principles of efficiency and reliability. The system is designed to be implemented using a variety of hardware and software technologies. The implementation is designed to be efficient, so that it can run on a wide range of hardware configurations. It is also designed to be reliable, so that it can provide consistent results over a long period of time. The implementation is also designed to be flexible, so that it can be adapted to different environments and requirements.

1.4. The System Evaluation

The system evaluation is based on the principles of objectivity and transparency. The system is designed to be evaluated using a variety of methods and metrics. The evaluation is designed to be objective, so that it can provide a fair assessment of the system's performance. It is also designed to be transparent, so that the results of the evaluation can be shared with all stakeholders.

Identifying Issues, Concerns, and Opportunities for Utah's Privately Owned Rangelands under Ecosystem Management

Collaborating Agency(ies): State of Utah (Mineral Lease)

Project location: Beaver, Duchesne, Piute, San Juan, Sevier, and Uintah counties, Utah

Project duration: July 1994-June 1995

Investigators: Mark W. Brunson
G. Allen Rasmussen

Technicians: Kim Richardson

Goals and objectives:

Our primary goal was to understand the knowledge and attitudes of Utah ranchers toward ecosystem management, with an emphasis on public-private partnerships. A semi-structured interview approach was used to describe: the current state of knowledge and beliefs about ecosystem management; ranchers' concerns and information needs regarding implementation of ecosystem management strategies in Utah; and willingness to participate in different forms of ecosystem-focused public/private partnership. Emphasis was on counties that are economically dependent on natural resources uses.

Progress to date:

Interviews were conducted in six Utah counties during January-March 1994. Preliminary analysis of the data has been completed, and analysis is ongoing.

Future plans:

A final project report to Utah State University's Vice President for Research is due this summer. In addition, results from this study will be synthesized with those from survey research conducted among Utah's non-industrial private forest landowners. Since the owners of most large private forest tracts in Utah are ranchers, we will be able to triangulate results of the two studies in order to more fully understand private landowners' attitudes toward ecosystem management.

Memorandum for the President on the Subject of the Atomic Energy Act

1. The Atomic Energy Act of 1946, which was passed by the Congress, is a landmark in the history of the United States. It is a law that will have a profound effect on the future of the Nation. It is a law that will give the United States the right to develop and use atomic energy for peaceful purposes. It is a law that will give the United States the right to develop and use atomic energy for military purposes. It is a law that will give the United States the right to develop and use atomic energy for all purposes.

2. The Atomic Energy Act of 1946 is a law that will have a profound effect on the future of the Nation. It is a law that will give the United States the right to develop and use atomic energy for peaceful purposes. It is a law that will give the United States the right to develop and use atomic energy for military purposes. It is a law that will give the United States the right to develop and use atomic energy for all purposes.

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4. The Atomic Energy Act of 1946 is a law that will have a profound effect on the future of the Nation. It is a law that will give the United States the right to develop and use atomic energy for peaceful purposes. It is a law that will give the United States the right to develop and use atomic energy for military purposes. It is a law that will give the United States the right to develop and use atomic energy for all purposes.

Assessing Public Attitudes toward Animal Damage Control Management Policies

Collaborating Agency(ies): U.S. Dept. of Agriculture, Animal and Plant Health
Inspection Service

Project location: Nationwide

Project duration: September 1994-July 1995

Investigators: Robert Schmidt
Mark W. Brunson

Technicians: Douglas Reiter
Amber Denton

Goals and objectives:

This is a nationwide study of attitudes toward wildlife damage management, designed to give the USDA's Animal Damage Control (ADC) program a better understanding of how Americans feel about the proper federal role in wildlife damage management and about various methods for controlling wildlife impacts on human activities. Specific objectives of the study were to identify: attitudes toward wildlife in general; beliefs about wildlife damage and its management; attitudes, beliefs, and preferences about the federal role in wildlife damage management; beliefs about the humaneness of wildlife control; general attitudes toward the environment; and characteristics of respondents.

Progress to date:

Surveys have been administered to a stratified random sample of Americans nationwide, with stratification based on ADC regional jurisdictions and regional variation in principal wildlife damage problems. Survey administration was completed in March 1995. Currently a telephone assessment of potential non-response bias is under way.

Future plans:

Data will be analyzed in Summer 1995, with the final project report due in October.

Advanced Foreign Language Curriculum Framework

Collaborative Learning	15% of Advanced Level and 10% of Intermediate Level
Project-Based Learning	10%
Formative Assessment	10%
Summative Assessment	10%
Self-Directed Learning	10%
Peer Review	10%
Portfolio Development	10%
Final Project	10%

The following table provides a detailed breakdown of the curriculum framework, including the percentage of time allocated to each component.

The curriculum framework is designed to provide students with a comprehensive and rigorous learning experience. It includes a variety of activities and assessments that are designed to develop students' language skills and cultural understanding. The framework is based on the following principles:

- Collaborative Learning: Students will work together in small groups to complete projects and assignments.
- Project-Based Learning: Students will engage in long-term projects that require them to apply their language skills in a real-world context.
- Formative Assessment: Teachers will use a variety of formative assessments to monitor student progress and provide feedback.
- Summative Assessment: Students will complete a final project and a summative assessment at the end of the course.
- Self-Directed Learning: Students will be encouraged to take ownership of their learning and to explore topics of interest on their own.
- Peer Review: Students will provide feedback to their peers on their projects and assignments.
- Portfolio Development: Students will develop a portfolio of their work throughout the course.
- Final Project: Students will complete a final project that demonstrates their mastery of the language and cultural concepts.

The curriculum framework is designed to be flexible and adaptable to the needs of individual students and schools. It includes a variety of activities and assessments that can be modified to suit different learning styles and levels of difficulty. The framework is based on the following principles:

- Collaborative Learning: Students will work together in small groups to complete projects and assignments.
- Project-Based Learning: Students will engage in long-term projects that require them to apply their language skills in a real-world context.
- Formative Assessment: Teachers will use a variety of formative assessments to monitor student progress and provide feedback.
- Summative Assessment: Students will complete a final project and a summative assessment at the end of the course.
- Self-Directed Learning: Students will be encouraged to take ownership of their learning and to explore topics of interest on their own.
- Peer Review: Students will provide feedback to their peers on their projects and assignments.
- Portfolio Development: Students will develop a portfolio of their work throughout the course.
- Final Project: Students will complete a final project that demonstrates their mastery of the language and cultural concepts.

The curriculum framework is designed to be flexible and adaptable to the needs of individual students and schools. It includes a variety of activities and assessments that can be modified to suit different learning styles and levels of difficulty. The framework is based on the following principles:

Identifying NIPF Owner Attitudes and Information Needs about Ecosystem Management

Collaborating Agency(ies): U.S. Dept. of Agriculture, Extension Service

Project location: Utah and Indiana

Project duration: July 1994-December 1995

Investigators: Mark W. Brunson
Michael R. Kuhns
Scott D. Roberts

Technicians: Susan Schroeder

Goals and objectives:

This project examines attitudes of non-industrial private forest landowners in two states with very different land uses and ownership patterns (Utah and Indiana). Our goal is to better understand what NIPF owners know and feel about ecosystem management, and to make that information available to Extension foresters as they develop information/education programs about private landowner participation in ecosystem management. Specific objectives are to identify: current NIPF uses; landowner information needs and preferred information sources; current beliefs about ecosystem management; attitudes toward regulatory or incentive approaches to encouraging participation in ecosystem management partnerships.

Progress to date:

Surveys were designed in conjunction with a research team at Clemson University conducting a similar study in the Southeast. Surveys were administered in Summer 1994, data were processed and analyzed in Fall 1994. Results have been presented in seminars at Utah State University, and preparation of a final report to USDA has begun.

Future plans:

A paper developed from the study will be presented at conferences in Madison, Wisc., and Corvallis, Ore., in Summer 1995. We have begun planning for a joint paper with the Clemson group, targeted to Journal of Forestry. In addition, results from this study will be synthesized

Statement of the Committee on the Administration of the Government

Chairman	Mr. J. Edgar Hoover
Vice Chairman	Mr. Clegg
Members	Mr. E. A. Tamm Mr. J. C. McLaughlin Mr. W. C. Clegg Mr. J. E. Connelley Mr. J. H. Egan Mr. J. G. Gurnea Mr. J. L. Rosen Mr. J. W. Tamm Mr. J. H. Tamm Mr. J. H. Tamm

The Committee on the Administration of the Government was organized on July 1, 1944, to study the administration of the Government and to make recommendations for improvement.

The Committee has held numerous public hearings and has received many suggestions from the public. It has also conducted extensive research into the various agencies of the Government and has held numerous private hearings with officials of these agencies. The Committee has found that there is a widespread feeling of dissatisfaction with the present administration of the Government. This dissatisfaction is based upon many factors, including the complexity of the Government, the overlapping of functions, the lack of coordination, the inefficiency of the present system, and the failure to keep abreast of the changing needs of the Nation.

The Committee believes that these factors are the result of a failure to plan for the future. It believes that the Government should be reorganized so that it can function more efficiently and more effectively. It believes that the reorganization should be based upon the principle of unity of function, so that all functions of the Government are performed by one agency. It believes that the reorganization should be based upon the principle of economy, so that the Government can operate at the lowest possible cost. It believes that the reorganization should be based upon the principle of flexibility, so that the Government can adapt to the changing needs of the Nation.

The Committee believes that the reorganization of the Government is essential for the Nation's future. It believes that the reorganization should be completed as soon as possible. It believes that the reorganization should be based upon the principles of unity of function, economy, and flexibility. It believes that the reorganization should be based upon the needs of the Nation.

TRANSIT

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With these few lines I wish to express my sincere appreciation to the many friends and relatives who have been so kind and generous in their contributions to the fund for the relief of the suffering and needy. The fund is now in a position to meet the needs of the most distressed and I am sure that the work of the fund will be continued for many years to come.

Yours truly,

Wm. H. H. H.

Wm. H. H. H.

Wm. H. H. H.

Wm. H. H. H.

Wm. H. H. H.

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Wm. H. H. H.

Wm. H. H. H.

Wm. H. H. H.

Wm. H. H. H.

Wm. H. H. H.

Measuring Meanings and Consequences of Acceptability Judgments for Wilderness Impacts

Collaborating Agency(ies): Aldo Leopold Wilderness Research Institute

Project location: Utah, Arizona, Wyoming, California

Project duration: October 1993-July 1995

Investigators: Mark W. Brunson

Technicians: Amy Hoss

Goals and objectives:

This study serves a dual purpose: providing wilderness managers with a tool to identify the social and ecological impacts of recreation use that are most relevant to wilderness visitors; and testing concepts concerning the social acceptability of natural resource practices and conditions. Because social acceptability is a goal of ecosystem management strategies, managers can benefit by knowing how people judge acceptability, what they mean when they say something is acceptable or unacceptable, and what are the consequences of unacceptable conditions. In addition, wilderness managers need to know which impacts are most salient to visitors so that they can concentrate resources on mitigating or reducing those impacts.

Progress to date:

Phase I of the research included a literature review of relevant social science research and interviews of wilderness visitors. This portion of the project was completed in August 1994, and data were analyzed in Fall 1994. The qualitative phase of the project showed that few impacts are completely unacceptable to wilderness visitors, but instead people employ coping behaviors to restore acceptability of their wilderness experiences. Subsequently surveys were administered in February-March 1995 aimed at learning more about wilderness coping behaviors. These data are now being analyzed.

Future plans:

Analysis of Phase II data on coping behaviors will be completed in Summer 1995, with a final project report to be completed in September 1995. Amy Hoss's M.S. thesis, which covers both phases of the project, is also scheduled for completion in September.

Statement of the Department of the Interior for the year ending 1900

Department of the Interior	Chief of Bureau
Assistant Secretary	John W. Foster
Under Secretary	John W. Foster
Commissioner of the General Land Office	John W. Foster
Commissioner of the Bureau of Reclamation	John W. Foster
Commissioner of the Bureau of Indian Affairs	John W. Foster
Commissioner of the Bureau of Fish and Game	John W. Foster
Commissioner of the Bureau of Geology	John W. Foster
Commissioner of the Bureau of Land Management	John W. Foster
Commissioner of the Bureau of Mines	John W. Foster
Commissioner of the Bureau of Plant Industry	John W. Foster
Commissioner of the Bureau of Soil Conservation	John W. Foster
Commissioner of the Bureau of Surveying and Mapping	John W. Foster
Commissioner of the Bureau of Waterways and Harbors	John W. Foster
Commissioner of the Bureau of Wildlife Management	John W. Foster

The Department of the Interior has the honor to acknowledge the receipt of the report of the

Commissioner of the Bureau of Reclamation, which report contains a full and complete statement of the work of the Bureau during the year ending 1900. The report is a valuable contribution to the knowledge of the public and is one of the most important documents of the Department. It is a pleasure to publish the report and to bring it to the attention of the public.

The Department of the Interior has the honor to acknowledge the receipt of the report of the Commissioner of the Bureau of Indian Affairs, which report contains a full and complete statement of the work of the Bureau during the year ending 1900. The report is a valuable contribution to the knowledge of the public and is one of the most important documents of the Department. It is a pleasure to publish the report and to bring it to the attention of the public.

The Department of the Interior has the honor to acknowledge the receipt of the report of the Commissioner of the Bureau of Fish and Game, which report contains a full and complete statement of the work of the Bureau during the year ending 1900. The report is a valuable contribution to the knowledge of the public and is one of the most important documents of the Department. It is a pleasure to publish the report and to bring it to the attention of the public.

Social Acceptability of Forest and Range Management in an Era of Changing Attitudes and Policies

Collaborating Agency(ies): U.S. Department of Agriculture (McIntire-Stennis)

Project location: Various locations

Project duration: July 1993-June 1998

Investigators: Mark W. Brunson

Technicians: none

Goals and objectives:

This is an umbrella project which provides the framework for the other research projects described. The overall goal of my research program is to understand public attitudes, uses, and values for public lands in the western U.S., so that human dimensions can be more adequately incorporated into ecosystem management strategies. Research focuses on three basic elements of the problem: describing public preferences for management of public forests and rangelands in the West; identifying factors that lead to the social acceptability of practices used to produce commodity and amenity resources on public lands; and measuring the acceptability of new practices and policies intended to better integrate social, ecological, and economic demands on public land resources.

Progress to date:

Several research projects have been completed since 1993, focusing on the meanings of social acceptability in a natural resource management context; attitudes toward innovative silvicultural practices; attitudes toward management of rangelands, including aspects of Range Reform '94; and attitudes toward management in interior Northwest forests. Ongoing projects are described in other portions of this document. Various reports, presentations at meetings and short courses; and peer-reviewed publications have resulted from this work.

Future plans:

Research under this program will continue through June 1998.

DRAFT
Page 1

Joint Declaration of Intent and Policy on the Use of Chemical Weapons and Poisons

1. The purpose of this Declaration is to establish a common understanding of the principles and policies governing the use of chemical weapons and poisons. It is intended to guide the actions of all parties involved in the development, production, stockpiling, and use of these weapons.

2. The parties to this Declaration are committed to the following principles:

- a. The prohibition of the use of chemical weapons and poisons in international armed conflict.
- b. The prohibition of the use of chemical weapons and poisons in non-international armed conflict.
- c. The prohibition of the use of chemical weapons and poisons in international terrorism.
- d. The prohibition of the use of chemical weapons and poisons in international piracy.

3. The parties to this Declaration are committed to the following policies:

- a. The development, production, stockpiling, and use of chemical weapons and poisons shall be subject to strict international control.
- b. The parties to this Declaration shall cooperate in the development of international instruments and mechanisms for the prohibition and control of chemical weapons and poisons.
- c. The parties to this Declaration shall cooperate in the development of international instruments and mechanisms for the prohibition and control of international terrorism.
- d. The parties to this Declaration shall cooperate in the development of international instruments and mechanisms for the prohibition and control of international piracy.

4. The parties to this Declaration are committed to the following principles and policies:

- a. The prohibition of the use of chemical weapons and poisons in international armed conflict.
- b. The prohibition of the use of chemical weapons and poisons in non-international armed conflict.
- c. The prohibition of the use of chemical weapons and poisons in international terrorism.
- d. The prohibition of the use of chemical weapons and poisons in international piracy.

Done at Geneva, Switzerland, on 10 September 1993.

**Katmai Research Project:
Levelock, Igiugig, Kokhanok, South Naknek**

Collaborating Agency(ies): National Park Service (Subsistence Division, Alaska)

Project Location: Southwestern Alaska

Project Duration: July 1993-March 1996

Investigators: Joanna Endter-Wada (Utah State University)
Douglas Levine (The Bowman Gray Medical School)

Cooperators: Alaska Department of Fish and Game, Subsistence Division
NPS Cooperative Research Unit, University of Washington
Bristol Bay Native Association, Dillingham, Alaska
Oral History Program, University of Alaska, Fairbanks

Senior Researcher: Judith M. Morris, Port Angeles, Washington

Research Assistants: Sean P. Keenan (Ph.D. Student, Utah State University)
Beverly Brummett (Ph.D. Student, University of Kansas)
Matthew Hanewald (M.S. Student, Utah State University)

Goals and Objectives:

The Katmai Research Project is a collaborative and multi-faceted data gathering effort designed to provide several user groups with information on the subsistence patterns of people residing in the vicinity of Katmai National Park and Preserve. The primary goal of this research project is to gather valid and representative survey, mapping, and ethnographic data on historic and current subsistence use patterns of residents of Igiugig, Kokhanok, Levelock and South Naknek. The user groups for this information include park and regional staff of the National Park Service, the Federal Subsistence Board and its staff committee, local study communities, and regional representatives of the study communities.

Research Strategy:

This research project consists of multiple data collection strategies, the simultaneous employment of which allows for a complementary approach that overcomes the individual weakness of each independent data set. This project incorporates the following data:
archival and ethnohistorical data; a subsistence harvest survey; mapping of subsistence use areas; a social relations questionnaire; ethnographic research; key informant interviews; and, oral histories.

All of the data have been gathered, except for some of the oral histories. Several interim deliverables have been submitted to the National Park Service (two reports, two data bases). Project personnel are in the process of analyzing the survey, mapping, and questionnaire data. The multiple sources of data will be synthesized into a draft final report, which will be reviewed by the NPS, project cooperators, communities and their representatives, and academic peers before revision and submission of a final report.

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Social and Economic Adaptations by Fish Harvesters in the Santa Barbara Channel - Santa Maria Basin Area, California

Collaborating Agency(ies): Minerals Management Service
United States Department of Interior

Project Location: South Central Coast of California

Project Duration: October 1993 - September 1996

Investigators: Joanna Endter-Wada (Forest Resources, USU)
Ronald L. Little (Sociology, USU)

Cooperators: Lynn A. Robbins (Western Washington University)
(Senior Researchers) Daniel Boxberger (Western Washington University)
Rachel Mason (U.S. Fish and Wildlife Service, Alaska)
Michael Kronman (Fisheries Consultant, Santa Barbara, CA)
Michael McCorkle (Commercial Fisher, Santa Barbara, CA)

Research Associate: Sean P. Keenan (Sociology, USU)
(Ph.D. Student)

Goals and Objectives:

The primary goal of this research is to assess the relative importance of the fishing industry to households, community social structures, and local economies in the California port communities of Channel Islands, Ventura, Santa Barbara, San Luis, and Morro Bay. Another goal is to differentiate and explicate the nature and extent of OCS development-induced changes from other changes occurring in the local fish harvesting industry. These goals are being accomplished through construction of a comprehensive historical profile of the fisheries and fishing communities in the Santa Barbara Channel-Santa Maria Basin Area, and of the economic, social, technological, and regulatory changes that have occurred between 1960 and 1990. Research methodologies include collection and interpretation of secondary and primary data; primary data collection consists of ethnography, key informant interviews, questionnaire surveys of people fishing commercially at present, and telephone surveys with commercial fishers who have left the industry.

Progress to Date:

Secondary data and primary ethnographic and key informant data were collected in 1993 and 1994. Preliminary synthesis and interpretation of those data and interim reports of findings were completed during the first half of 1995. The questionnaire survey was developed, pretested, and revised several times during 1994. Questionnaire surveys of current commercial fishers will be

9. *Laurel*

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THE 1950-1951 season was a very dry one in the United States. The weather was very hot and dry, and the crops were very poor. The government has been very busy in the past few years, and the people have been very poor. The government has been very busy in the past few years, and the people have been very poor.

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Extension Forestry Program Support

Collaboating Agency(ies): Utah Division of Sovereign Lands and Forestry

Project Location: USU campus and throughout Utah

Project Duration: April 1992 - June 1996

Investigators: Michael R. Kuhns
Terry L. Sharik

Goals and Objectives:

The goal of this arrangement is to team up with USU Cooperative Extension to provide extension forestry programming in the state of Utah. This extension forestry program will increase the number, quality, and usefulness of landscape and conservation trees in Utah; educate Utahns about the importance of forests and other natural resources; improve Utahns' ability to make informed decisions about environmental issues and resource use or preservation; and promote trees and forests for maintaining healthy local, regional, and global environments.

Progress to Date:

This project was put in place through negotiations between the state forester and USU in 1990 and 1991, at which time an extension forestry specialist was recruited. Dr. Michael Kuhns started in this position in May 1992, having come to USU from the University of Nebraska, where he had served as extension forester for six years. Since this agreement began USU received \$75,000 in fulfillment of an initial two-and-one-half-year agreement that ended June 30, 1994. An additional \$30,000 was given to USU for a continuation of this agreement from July 1, 1994 to June 30, 1995. These funds came from the Utah Division of Sovereign Lands and Forestry who received them from USDA-Forest Service State and Private Forestry. Since 1992 Dr. Kuhns has created an extension program that extends across the state and includes the subject areas of rural/conservation forestry, forestry in the wildland/urban interface, urban/community forestry, and environmental education. He is active in the Utah Community Forest Council, the Utah Forest Stewardship Coordinating Committee, and in Project Learning Tree. Funding has helped accomplish the following: 65 presentations at conferences, workshops, etc.; 23 conferences/workshops planned; 5,350 persons directly contacted through extension forestry programs; dozens of communities directly assisted in 27 counties; 18 brochures, popular articles, etc. produced; and \$91,000 additional grant funding received.

Future Plans:

A new agreement for \$28,000 is in place to extend funding through June 30, 1996. Work is proceeding on producing a "Trees of Utah" book and other publications, and on planning various programs and workshops for the coming year. It is our hope that an agreement can be in place within the next year that will extend this funding arrangement beyond 1996.

Estimate of Energy Program Budget

1. Research and Development	1968 - 1970
2. Construction	1968 - 1970
3. Operation and Maintenance	1968 - 1970
4. Administration	1968 - 1970
5. Miscellaneous	1968 - 1970

The following table shows the estimated costs of the program for the years 1968 through 1970.

The total cost of the program for the years 1968 through 1970 is estimated to be \$1.2 billion. This estimate is based on the assumption that the program will be carried out at a level of activity consistent with the goals and objectives of the program. The actual costs may vary depending on the progress of the program and the availability of funds.

The program is divided into five major categories: Research and Development, Construction, Operation and Maintenance, Administration, and Miscellaneous. The Research and Development category is the largest, accounting for approximately 40% of the total cost. This category includes the costs of developing new technologies and improving existing ones. The Construction category accounts for approximately 30% of the total cost and includes the costs of building new facilities and upgrading existing ones. The Operation and Maintenance category accounts for approximately 20% of the total cost and includes the costs of running the program on a day-to-day basis. The Administration category accounts for approximately 10% of the total cost and includes the costs of managing the program. The Miscellaneous category accounts for approximately 10% of the total cost and includes the costs of other items not covered by the other categories.

A new estimate of the total cost of the program for the years 1968 through 1970 is \$1.2 billion. This estimate is based on the assumption that the program will be carried out at a level of activity consistent with the goals and objectives of the program. The actual costs may vary depending on the progress of the program and the availability of funds.

Hill Air Force Base Community Forestry Inventory and Plan

Collaborating Agency(ies): Hill Air Force Base

Project Location: Hill Air Force Base, Utah

Project Duration: March 1993 - October 1994

Investigators: Michael R. Kuhns

Goals and Objectives:

The goal of this project was to improve the community forestry resources of Hill Air Force Base, Utah by conducting a landscape tree inventory and by producing a community forestry plan based on that inventory and on management objectives. Additional funding received in 1994 required development of landscape renovation and replacement plans for the west and south gates of the base.

Progress to Date:

The community forestry inventory was completed in the summer of 1993 and data entry was done the following winter. Data analysis was then completed in early 1994 and a plan based on this data was developed that spring and delivered to officials at Hill AFB. They also received a copy of the tree inventory software and the database at that time. A poster was developed on this project and was presented at the Society of American Foresters Convention in Anchorage, Alaska in September 1994. Landscape replacement plans were developed by Dr. Craig Johnson in 1994.

Future Plans:

This project is essentially complete, though data sheets still need to be delivered to Hill. Dr. Kuhns is currently working on a paper describing this project to be published in the Journal of Arboriculture or other suitable journal. Possible related projects for the future include transferring tree data to a GIS and working on developing landscape plans to reduce energy use on the base. We also are interested in surveying base residents and workers on their attitudes about the base landscape.

Identifying NIPF Owner Attitudes and Information Needs About Ecosystem Management

Collaborating Agency(ies): USDA Extension Service

Project Location: Utah and Indiana

Project Duration: July 1994 - September 1995

Investigators: Michael R. Kuhns
Mark W. Brunson
Scott D. Roberts

Goals and Objectives:

The goal of this project is to determine attitudes about ecosystem management among nonindustrial private forest (NIPF) landowners in Utah, a state with considerable public forest land interspersed with scattered tracts of private land, and Indiana, a state with mostly private forest land. This information can then be used to guide extension ecosystem management programming nationwide

Progress to Date:

A mail survey of NIPF landowners in Utah and Indiana was conducted in the summer of 1994. This survey was coordinated with a similar survey being conducted in the southeastern U.S. by Clemson University. Data was entered and analysis begun in winter 1994-95. Several seminars about our findings have been presented.

Future Plans:

Several papers on the results of this survey will be prepared in the summer of 1995. Results will also be presented at two conferences this summer. A final report on the project will be prepared and delivered to the granting agency by August.

Interagency Policy on the Analysis and Information Needs of the Intelligence Community

1. The Intelligence Community (IC) is composed of the Central Intelligence Agency (CIA), the Defense Intelligence Agency (DIA), the National Security Agency (NSA), and the State Department Intelligence Community (SDIC).

2. The IC is responsible for providing the President and the National Security Council with the information and analysis they need to make decisions on national security.

3. The IC is also responsible for providing the President and the National Security Council with the information and analysis they need to make decisions on international relations.

4. The IC is also responsible for providing the President and the National Security Council with the information and analysis they need to make decisions on domestic security.

5. The IC is also responsible for providing the President and the National Security Council with the information and analysis they need to make decisions on the environment.

6. The IC is also responsible for providing the President and the National Security Council with the information and analysis they need to make decisions on science and technology.

7. The IC is also responsible for providing the President and the National Security Council with the information and analysis they need to make decisions on the economy.

8. The IC is also responsible for providing the President and the National Security Council with the information and analysis they need to make decisions on the arts and humanities.

9. The IC is also responsible for providing the President and the National Security Council with the information and analysis they need to make decisions on the health and safety of the American people.

10. The IC is also responsible for providing the President and the National Security Council with the information and analysis they need to make decisions on the environment.

11. The IC is also responsible for providing the President and the National Security Council with the information and analysis they need to make decisions on the economy.

12. The IC is also responsible for providing the President and the National Security Council with the information and analysis they need to make decisions on the arts and humanities.

13. The IC is also responsible for providing the President and the National Security Council with the information and analysis they need to make decisions on the health and safety of the American people.

1995 Statewide Fishery Management Survey

Collaborating Agency(ies): Utah Division of Wildlife Resources

Project Location: Utah (state-wide)

Project Duration: June 1994 through June 1996

Investigators: Rob Lilieholm, Rick Krannich

Technicians: Aaron Kelson

Goals & Objectives:

Determine angler harvests and views on various management practices state-wide

Progress to Date:

Just beginning survey work

Future Plans:

Complete survey mailing over the year, compile results for report due in June 1996.

2002-2003 Financial Management Review

1. Financial Review	1.1. Overview of Financial Performance
1.2. Key Findings	1.3. Recommendations
2. Budgetary Control	2.1. Budgetary Framework
2.2. Budgetary Performance	2.3. Budgetary Control Systems
3. Financial Reporting	3.1. Financial Reporting Framework
3.2. Financial Reporting Performance	3.3. Financial Reporting Systems

The financial management review for the 2002-2003 financial year has been completed. The review has identified a number of key findings and recommendations. The findings are as follows:

- 1.1. Overview of Financial Performance
- 1.2. Key Findings
- 1.3. Recommendations

The recommendations are as follows:

- 2.1. Budgetary Framework
- 2.2. Budgetary Performance
- 2.3. Budgetary Control Systems
- 3.1. Financial Reporting Framework
- 3.2. Financial Reporting Performance
- 3.3. Financial Reporting Systems

Economic Development of Wood-based Industry in the Uinta Basin

Collaborating Agency(ies): State of Utah, Mineral Lease funds

Project Location: Uinta Basin, Utah

Project Duration: June 1994 through June 1996

Investigators: Rob Lilieholm

Technicians: None

Goals and Objectives:

Assess timber supply and milling capacity in the Basin

Progress to Date:

Draft report finished

Future Plans:

Expand to a directory of wood-based industry in Utah

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Environmental Impact Statement of the proposed project in the State of Texas

Environmental Impact Statement
Project Location
Project Description
Project Location
Project Description
Project Location
Project Description

Environmental Impact Statement
Project Location
Project Description
Project Location
Project Description
Project Location
Project Description

Controls on the Allocation of Production in Coniferous Forest Ecosystems

Collaborating Agency(ies): USDA/CSRS

Project Duration: ends 1996

Investigators: James N. Long
(with F.W. Smith and A.W. Schoettle/subcontract to USU).

Goals and Objectives:

Basic research in the production ecology of coniferous forest ecosystems.

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Committee on the Administration of Justice in England and Wales

1979-1980

Chairman: Lord Justice Goff

1979-1980

Chairman: Lord Justice Goff

1979-1980

Chairman: Lord Justice Goff

1979-1980

1979-1980

Chairman: Lord Justice Goff

Chairman: Lord Justice Goff

Silviculture of Intermountain Subalpine Spruce-fir Forests

Collaborating Agency(ies): UES/CSRS

Project Duration: ends 1997

Investigators: James N. Long

Goals and Objectives:

Applied research in support of effective management of Rocky Mountain subalpine forests.

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Page 1

Statement of Work for the Development of a New Product

Project Manager: [Name]

Project Number: [Number]

Project Start Date: [Date]

Project End Date: [Date]

Project Description: [Description]

Southwest Forest Study

Collaborating Agency(ies): USDA Forest Service

Project Duration: ends 1995

Investigators: James N. Long

Goals and Objectives:

Applied research in support of effective management of southwest forests.

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Executive Summary

10/24/2008

Page 1 of 1

10/24/2008

10/24/2008

The following information is provided for your information and is not intended to be used as a basis for any action.

10/24/2008

The following information is provided for your information and is not intended to be used as a basis for any action.

**Establishment of native plant communities
on military ranges, Camp Williams, UT**

Collaborating Agency(ies): Utah National Guard

Project Duration: ends 1996

Investigators: James N. Long

Goals and Objectives:

Applied research in support of effective resource management at Camp Williams, UT

1980
1981

Establishment of new spin communities on the new target Group 10, 11

Information Department
1980-1981
1982-1983
1984-1985

Information Department
1980-1981
1982-1983
1984-1985

Information Department
1980-1981
1982-1983
1984-1985

**A program for continuing education in ecosystem management
--a development grant**

Collaborating Agency(ies): USDA Forest Service, R-4

Project Duration: ends 1996

Investigators: James N. Long

Goals and Objectives:

Development of a continuing education program in ecosystem management

Ecological research at Camp Williams

Collaborating Agency(ies): Utah National Guard

Project Duration: ends 1996

Investigators: James N. Long

Goals and Objectives:

Applied research in support of effective ecosystem-based management at Camp Williams, UT.

DRAFT
Page 1

Memorandum for the Secretary of Defense

Subject: [Illegible]
Reference: [Illegible]
Action: [Illegible]

[Illegible]

[Illegible]

Tickville Springs Watershed Improvement

Collaborating Agency(ies): DOD Legacy Program

Project Duration: ends 1996

Investigators: James N. Long
(w/ Douglas Johnson)

Goals and Objectives:

Development of a riparian restoration program for Camp Williams, UT.

CRAP 1997

CRAP 1997

CRAP 1997

CRAP 1997

CRAP 1997

CRAP 1997

**Population, Distribution and Habitat Study for Threatened,
Endangered, and Sensitive Species of Plants and Animals within
Hill Air Force Base Restricted Air Space and Associated Public
Lands. Phase I: Literature Review**

Collaborating Agency(ies): Department of Defense (Hill Air Force Base)

Project Location: West Desert area of northwestern Utah and adjacent Nevada

Project Duration: October 1, 1994 - September 30, 1995

Investigators: Terry L. Sharik (Co-Coordinator)
Neil E. West
Leila M. Shultz
Charles P. Hawkins
Michael L. Wolfe

Technicians: Molly Hysell
Kate Bartz

Goals and Objectives:

Our overall goal is to conduct a literature and data search to include all sources of information available to aid in preparation for Phase II (field studies) of the project. Specific objectives are to: (1) identify and collect available literature, data, maps, remote sensing, and GIS data layers pertinent to the study, with emphasis on threatened, endangered, and otherwise sensitive (TES) species, including their habitats; (2) sort and evaluate materials in Objective 1, and to scan documents not already in digital format, develop a GIS database and link literature and data to data layers; (3) develop a hierarchical ecosystem classification system(ECS) to delineate areas within the study area that have similar biota, climate, and geology/substrates; (4) link existing TES species information with the distribution of ecosystems to determine areas of special concern; (5) determine from the literature and available data in combination with the ECS, those areas of likely significance for TES species that are lacking in floral and faunal information; and (6) begin field plot allocation to focus intensive studies on areas of special concern, including those lacking an adequate information base.

Progress to Date:

We have developed a protocol for abstracting the literature and referencing it to a GIS database. Over a 1000 sources have been identified, with perhaps 25% of the sources processed (i.e., abstracted and geo-referenced). We have developed the protocol for a

Future Plans:

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Enclosed is a copy of the draft report on the proposed development for the site at the corner of the main road and the railway line.

The report is a preliminary one and is subject to change. It is intended to provide a general overview of the proposed development and to identify the key issues that need to be addressed in the final report.

Application and calibration of MANIC (Model of Assimilation of Nitrogen in Catchments) to a high-elevation watershed in the Great Smoky Mountains

Collaborating Agency(ies): Environmental Protection Agency
(subcontract with the University of Virginia,
Charlottesville, VA)

Project Location: Great Smoky Mountains National Park

Project Duration: October 1994- October 1995

Investigators: Helga Van Miegroet

Research Assistants: Stephanie Kase

Goals and Objectives:

The objective of this study is to test and calibrate MANIC (Model of Assimilation of Nitrogen in Catchments), a nitrogen dynamics model, to the nitrogen dynamics in high-elevation spruce-fir forests in the Southern Appalachians known to be nitrogen-saturated. The model developed at the University of Virginia is a process-oriented model of watershed nitrogen dynamics at the catchment scale that integrates detailed and fine-scaled knowledge on nitrogen cycling processes with larger-scale knowledge of whole watershed hydrogeochemical processes. The background information, including atmospheric nitrogen deposition, forest growth and nutrient cycling patterns, soil N dynamics, and soil and stream water N concentrations that are needed to calibrate the model to this particular ecosystem are mostly available from past and ongoing experimental studies in which the principal investigator is or has been involved as a collaborator.

Progress to Date:

Available data related to nitrogen dynamics in high-elevation forests of the Southern Appalachians are currently being gathered, summarized and reduced to a format appropriate for model input. Model runs are scheduled for summer 1995.

Future Plans:

Evaluate the success of the model in accurately reflecting the soil and stream water dynamics observed in the field, and summarize our findings in a journal article.

Tree-induced changes in soil fertility in the spruce-fir zone of northern Utah

Collaborating Agency(ies): State of Utah (Mineral lease)

Project Location: Utah, T.W. Daniel Forest

Project Duration: June 1994-June 1995

Investigators: Helga Van Miegroet

Technicians: Molly Hysell
Amber Denton (Honors Thesis)

Goals and Objectives:

Limitations in water and nutrient availability strongly restrict the growth and production of plants in arid regions, and plants develop adaptive strategies to cope with such resource limitations. This study investigates the role of subalpine fir clusters in the localized improvement of soil fertility in an upper montane forest in Northeastern Utah. It will specifically investigate the role of mature "mother" trees in causing changes in the nutrient distribution patterns and in the temperature and moisture conditions underneath tree canopies as compared to more exposed areas that result in increased nutrient availability and better growing conditions. It will expand on past and ongoing research in forest ecosystems ecology into the area of biogeochemical processes and soil-tree interactions. It will form the basis for future research initiatives in the area of arid and montane ecosystems ecology.

Progress to Date:

Temperature, soil moisture, and snow depth measurements have been made from Fall 1994 through Spring 1995. They are still ongoing and intended to verify the influence of mature trees on the soil physical properties within the canopy influence sphere. Soil sampling and a litter decomposition study will be initiated in Summer 1995 to further test tree influence on soil chemistry and nutrient cycling processes.

Future Plans:

Results from this study will be presented at scientific meetings, and the litter decomposition study be the basis for an honors thesis. Based on the results from this study a more extensive grant proposal will be prepared for further research on resource dynamics in tree clusters and at forest edges of montane forest ecosystems in the semi-arid west.

Soil characterization with reference to land use capability in Camp Williams, Utah

Collaborating Agency(ies): Utah National Guard

Project Location: Camp Williams, Draper, UT

Project Duration: October 1994--October 1996

Investigators: Helga Van Miegroet

Research Assistants: Brenda Tall

Goals and Objectives:

The objective of this study is to characterize and classify soils at the Camp Williams Training Area in relation to land use capabilities of surface soils. The study is conducted in three phases: (1) Characterization of soil physical properties including soil profile description, terrain features relevant to erodibility, physical properties related to soil behavior; (2) Classification of soils in broad groups based on soil behavior, physical characteristics, terrain features and vegetation cover; and (3) Characterization of land use capability based on the above information integrated with land use and disturbance regime as the training facility.

Progress to Date:

During Summer 1994 a field survey of soil pedons and soil properties was conducted in conjunction with the LCTA (Land Condition Trend Analysis) associated with the major vegetation types present at Camp Williams. Soil texture analysis, soil descriptions and classification have been completed and the available data are currently being analyzed for major trends and landscape patterns. Characterization of soil water behavior is currently under way and will proceed through the next year.

Future Plans:

Results from this study will be presented at national and regional scientific meetings, and are expected to lead to broad recommendations with respect to land use limitations and erodibility. Further funding for the expansion of this study will be pursued possibly related to the evaluation of erodibility, integration of field data with GIS activities, and the role of soil chemical and physical properties in vegetation establishment (e.g., following fire)

Nitrogen dynamics and nitrate export from Southern Appalachian forests

Collaborating Agency(ies): U.S. Department of Agriculture - Cooperative State
Research Service
U.S. Department of the Interior - National Park Service
(through a subcontract with the University of Tennessee,
Knoxville, TN)

Project Location: Great Smoky Mountains National Park

Project Duration: June 1992 - June 1995

Investigators: Helga Van Miegroet

Goals and Objectives:

The objective is to study basic mechanisms regulating non-point inputs of nitrate from upland forested watersheds into streams in the Great Smoky Mountains National Park. The study specifically investigates the relative role of soil biological processes and uptake by vegetation in the degree of nitrogen saturation. It involves a series of nutrient cycling plots located in two upland forest ecosystems (northern hardwoods and spruce-fir) at different stages of stand developments (regeneration, aggrading, and mature). The study tests to what extent the balance between nitrogen inputs (via atmospheric deposition and through nitrogen mineralization) and nitrogen sinks (via plant uptake) in these systems will determine the rate of nitrate leaching out of these forest ecosystems.

Progress to Date:

The collection of throughfall and soil solutions and nitrogen mineralization data is nearing completion at the different sites. Preliminary data indicate no significant differences in throughfall nitrogen input between the different spruce-fir sites. The largest nitrate leaching rates seem to occur under mature vegetation while the presence of spruce/fir regeneration significantly reduces nitrate leaching losses below the rooting zone. The mineralization data are currently being analyzed. Several presentations have been already been made at national and local scientific meetings.

Future Plans:

Several journal articles are planned as results become available. The results from this study in conjunction with an ongoing stream survey and the watershed research in the high-

Strategy of research and related efforts from Cooperative Agricultural Research

Cooperative Agricultural Research
U.S. Department of Agriculture - Cooperative State
Department of Agriculture
U.S. Department of the Interior - National Park Service
Bureau of Entomology and Plant Quarantine
Bureau of Plant Industry
Bureau of Soils
Bureau of Weather Service
Bureau of Entomology and Plant Quarantine
Bureau of Plant Industry
Bureau of Soils
Bureau of Weather Service
Bureau of Entomology and Plant Quarantine
Bureau of Plant Industry
Bureau of Soils
Bureau of Weather Service

The following is a brief summary of the research and related efforts from the various departments and agencies of the U.S. Department of Agriculture, U.S. Department of the Interior, and U.S. Department of Weather Service, which are related to the study of the biology, ecology, and control of insects and other arthropods. The research is being conducted in the following areas: (1) the biology and ecology of insects and other arthropods; (2) the control of insects and other arthropods; (3) the use of insects and other arthropods in agriculture and industry; (4) the use of insects and other arthropods in medicine and public health; (5) the use of insects and other arthropods in the study of the evolution and systematics of insects and other arthropods.

The following is a brief summary of the research and related efforts from the various departments and agencies of the U.S. Department of Agriculture, U.S. Department of the Interior, and U.S. Department of Weather Service, which are related to the study of the biology, ecology, and control of insects and other arthropods. The research is being conducted in the following areas: (1) the biology and ecology of insects and other arthropods; (2) the control of insects and other arthropods; (3) the use of insects and other arthropods in agriculture and industry; (4) the use of insects and other arthropods in medicine and public health; (5) the use of insects and other arthropods in the study of the evolution and systematics of insects and other arthropods.

The following is a brief summary of the research and related efforts from the various departments and agencies of the U.S. Department of Agriculture, U.S. Department of the Interior, and U.S. Department of Weather Service, which are related to the study of the biology, ecology, and control of insects and other arthropods. The research is being conducted in the following areas: (1) the biology and ecology of insects and other arthropods; (2) the control of insects and other arthropods; (3) the use of insects and other arthropods in agriculture and industry; (4) the use of insects and other arthropods in medicine and public health; (5) the use of insects and other arthropods in the study of the evolution and systematics of insects and other arthropods.

7/14/95

elevation spruce-fir zone of the Great Smoky Mountains National Park, have lead to the development of another research proposal submitted to EPA-NSF. It is anticipated that other proposals to federal funding agencies will evolve from this effort.

Funding Agency(ies): Southern Appalachian Mountains Institute

Project Location: Southern Appalachian Mountains

Project Duration: March 1995 - October 1995

Description: Ridge Top Landscapes

Goals and Objectives

Report to be prepared by a joint team from Duke Univ. Department, M.S. Forest Service, Tennessee Valley Authority, and Martin White's Tower, located in the Southern Appalachian Mountains Institute. The purpose of the report is to review, from available studies and existing data, the current status, recent changes and extent of changes in the distribution of Great Smoky Mountains National Park. The focus is on the current forest, including its ecology, its and its dependence on soil properties and existing patterns in high elevation, mountain forests, and how these changes in natural resources impact the health of the forest in the Southern Appalachian Mountains.

Report to Duke University and other project partners in progress.

Future Plans: Preparation of final report.

DRAFT
10/1/77

Enclosed for the Bureau are two copies of the report of the
Investigative Committee on the activities of the
American Revolutionaries in the United States.

Very truly,
Yours,
[Signature]

Evaluation of effects of acidic deposition to terrestrial ecosystems in Class I areas of the Southern Appalachians -- Soils and nutrient cycling

Collaborating Agency(ies): Southern Appalachian Mountains Initiative

Project Location: Southern Appalachian Mountains

Project Duration: March 1995--October 1995

Investigators: Helga Van Miegroet

Goals and Objectives:

Report to be prepared by a joint team from Utah State University, U.S. Forest Service, Tennessee Valley Authority and Martin Marietta Energy Systems to the Southern Appalachian Mountain Initiative. The purpose of the report is to evaluate, from available studies and existing data, the current status, recent changes and causes of changes in terrestrial ecosystems of Class I Areas in the Southern Appalachians. The focus is on the current understanding of the role of N and S deposition on soil properties and cycling patterns in high-elevation spruce-fir forests, and how these changes in nutrient availability impact the health of red spruce in the Southern Appalachian Mountains.

Progress to Date: Literature review and report preparation are in progress.

Future Plans: Preparation of final report.

Evaluation of effects of acidic deposition on terrestrial ecosystems in Class I areas of the National Antiquities - Soils and Surface Geology

Cooperating Agencies: Federal Agencies: National Antiquities

Project Location: National Antiquities

Project Period: March 1983 - October 1983

Investigator: John Van Meters

Summary: This report describes the results of a study of the effects of acidic deposition on terrestrial ecosystems in Class I areas of the National Antiquities.

Goals and Objectives

The primary goal of this study was to determine the effects of acidic deposition on terrestrial ecosystems in Class I areas of the National Antiquities. The study was designed to evaluate the effects of acidic deposition on the following: (1) the physical and chemical properties of the soil; (2) the biological properties of the soil; (3) the physical and chemical properties of the surface geology; and (4) the biological properties of the surface geology. The study was conducted in Class I areas of the National Antiquities, which are areas of the National Antiquities that are designated as Class I areas because of their exceptional natural resources.

The study was conducted in Class I areas of the National Antiquities, which are areas of the National Antiquities that are designated as Class I areas because of their exceptional natural resources.

Future Work: Further study of the effects of acidic deposition on terrestrial ecosystems in Class I areas of the National Antiquities.

Development of a Sediment Budget for the Canyon of Lodore in Dinosaur National Monument

Collaborating Agency(ies): U.S. National Park Service

Project Location: Dinosaur National Monument, Colorado and Utah

Project Duration: May 1995 - May 1997

Investigator: John C. Schmidt

Goals and Objectives:

Research will focus on (1) measurement of sediment-transport characteristics of the Green River at Gates of Lodore and Echo Park, (2) development of a sediment rating relation for the Green River at Gates of Lodore and Echo Park, (3) measurement of channel bed changes in the Canyon of Lodore, and (4) measurement of channel bank changes in the Canyon of Lodore. The primary times of measurement will be during high discharge in 1995 and 1996, although other measurements will be made prior to and following peak flows. These data will be used to develop a sediment budget for the Canyon of Lodore. The primary times of measurement will be during high discharge in 1995 and 1996, although other measurements will be made prior to and following peak flows. These data will be used to develop a sediment budget for the Canyon of Lodore and to predict the effect of high discharges on the geomorphology of the Green River.

Progress to Date:

Channel cross-sections in the Canyon of Lodore were resurveyed in June 1995. Sediment transport measurements will begin on July 17.

Development of a National System for the Control of Land Use in the National Capital District

Colin Clark, Director
Urban Planning Division
Ministry of Planning and Development
1968-1969
John C. Smith

Executive Summary

Introduction

The purpose of this study is to examine the possibilities of developing a national system for the control of land use in the National Capital District. The study is based on a review of the existing land use control system in the District and on a survey of the land use control systems in other countries. The study finds that the existing system is inadequate and that a new system is needed. The study also finds that a national system for the control of land use is feasible and that it would be beneficial to the District. The study recommends that a national system for the control of land use be developed and that it be based on the principles of the National Capital District Act.

Program to Date

Current work on the National Capital District Act is being completed in June 1968. The National Capital District Act will be passed in July 1968.

Geomorphology of the Valley of the Green River through Dinosaur National Monument

Collaborating Agency(ies): U.S. National Park Service

Project Location: Dinosaur National Monument, Colorado and Utah

Project Duration: September 1993 - December 1995

Investigators: John C. Schmidt
Paul E. Grams (graduate student - geology)

Goals and Objectives:

The purpose of this study is to map and define the relation between management resources of the corridor and discharge of the Green River. The approach we are taking is to map the surficial geology and geomorphology of the river corridor as it exists at present, compare the present status of these deposits with their status as depicted on historical ground-level and aerial photography, determine the relation between management resources and geomorphological mapping units, and to determine the discharges necessary to form and maintain these resources.

Progress to Date:

We have completed one full season of field work, and have surveyed the channel of the river at 1-mi. intervals over the 45 mi. of the monument. We have matched more than 35 historical ground-level photographs that are the basis of our analysis of channel and vegetation change. We have also completed preliminary geological analysis of deposits throughout the corridor. Our research results have been used by the Park Service in developing a preliminary strategy concerning pursuit of water rights claims for the monument.

One presentation has resulted from this project to date:

Geomorphology of the Valley of the Great River through Tennessee National Monument

U.S. National Park Service
Tennessee National Monument, Columbia and Park
Geology 1955 - December 1955
John C. Schuch
Paul E. Smith (Geology, Biology - Zoology)

Abstract: This report describes the geomorphology of the Valley of the Great River through Tennessee National Monument, Tennessee, and the surrounding area. The report includes a description of the valley floor, the surrounding hills, and the river itself. The report also includes a description of the geology of the area, and a description of the vegetation and wildlife. The report is intended for use by the National Park Service, and by the public.

Introduction and Objectives

The purpose of this report is to describe the geomorphology of the Valley of the Great River through Tennessee National Monument, Tennessee, and the surrounding area. The report includes a description of the valley floor, the surrounding hills, and the river itself. The report also includes a description of the geology of the area, and a description of the vegetation and wildlife. The report is intended for use by the National Park Service, and by the public.

Geology of the Area

The geology of the area is described in this section. The report includes a description of the valley floor, the surrounding hills, and the river itself. The report also includes a description of the geology of the area, and a description of the vegetation and wildlife. The report is intended for use by the National Park Service, and by the public.

Vegetation and Wildlife

The vegetation and wildlife of the area are described in this section. The report includes a description of the valley floor, the surrounding hills, and the river itself. The report also includes a description of the geology of the area, and a description of the vegetation and wildlife. The report is intended for use by the National Park Service, and by the public.

Grams, P.E., Schmidt, J.C., and Leschin, M.F., 1994, Fine-grained deposits in canyons of the Green (eastern Uinta Mountains) and Colorado (Grand Canyon) Rivers: (abst.), in AGU 1994 Fall Meeting Program & Abstracts: Eos, v. 75, p. 272.

Collaborating Institution

U.S. Forest Service
Forest Science Technology Center

Project Location

Utah-Wyoming, U.S.A.

Project Duration

September 1993 - December 1993

Investigators

John C. Schmidt
Mark G. Packard (graduate student - MS)

Technician

Robert Ligon

Goal and Objectives

The purpose of this study is to evaluate the long-term impact of water diversion on water-divided mountain streams. The study area is the Uinta Mountains, a large region where water-divided rivers flow to the east of the divide. Our goal is to characterize the geomorphic organization of these mountain streams, although different if the geomorphic organization of unregulated and regulated streams and variations in the amount of stream channel flow and regulated streams. To achieve this goal, we are conducting detailed field studies that involve mapping, sampling, and hydrologic analysis. We are also utilizing the integrated data base of the U.S. Geological Survey to evaluate stream flow and sediment transport rates and the geomorphic evolution of these mountain streams.

Progress to Date

Our review of field work has been completed on the project, which has led to an initial characterization of the geomorphic organization of unregulated streams. We have also completed initial studies of 3 streams and are evaluating the extent of geomorphic reorganization caused by the high sediment discharge of 1993. During the completion of the first field season, we will be evaluating the geomorphic organization of regulated streams throughout the region. No preliminary data have been published from this project.

Evaluation of the Long-term Effect of Water Diversions on Mountain Streams

Collaborating Agency(ies): U.S. Forest Service
Stream Systems Technology Center

Project Location: Uinta Mountains, Utah

Project Duration: September 1993 - December 1995

Investigators: John C. Schmidt
Mark G. Smelser (graduate student - WS)

Technicians: Spencer Logan

Goals and Objectives:

The purpose of this study is to evaluate the long-term impact of water diversions on steep, coarse-bedded mountain streams. The study area is the Uinta Mountains, a large region where water development dates to the turn of the century. Our goal is to characterize the geomorphic organization of these mountain streams, distinguish differences in the geomorphic organization of unregulated and regulated streams, and distinguish differences in the history of channel changes between unregulated and regulated streams. To accomplish this task, we are conducting detailed field studies that involve mapping, sampling, and hydrologic data collection. We are also analyzing the archived data records of the U.S. Geological Survey because historical gaging station notes include valuable data about the past geomorphic condition of Uinta Mountain streams.

Progress to Date:

One season of field work has been completed on this project, which has led to an initial characterization of the geomorphic organization of unregulated streams. We have also installed marked gravel in 3 streams and are measuring the extent of geomorphic reorganization caused by the high snowmelt discharges of 1995. During the remainder of the 1995 field season, we will be measuring the characteristics of regulated streams throughout the region. No publications have been prepared from this project.

PRINCIPAL CONTACTS

The following persons will be the principal contacts for self-initiative agencies or organizations in the area of education of the public. These persons may be placed at the head of or responsible for the project.

APPENDIX

Principal Contacts

William A. Kennedy, Staff Leader, Washington and Wildlife Fund, Box 1
R. Craig Allen, Director, AEMA Center

William A. Kennedy, Staff Leader, Washington and Wildlife Fund, Box 1

Department of Defense, Army National Guard

Col. Stephen Moore, Park Ranger, Fish and Wildlife, Army National Guard, W.A.
D.C.

- Principal Contacts

Col. Philip Spence, Park Ranger, Fish and Wildlife, Army National Guard, WA D.C.

Col. Robert Markham, Washington D.C.

Major David Hill, WA

John Crow, Environmental Research Laboratory, State of Washington Department

- Listing of Collaborators

Regional Field Office

John Sullivan, Leader Fish and Wildlife Research Unit, WA

Thomas C. Edwards, Jr., Asst. Leader Fish and Wildlife Research Unit, WA

- Other Current Projects

Regional Field Office

Jeffrey L. Anderson, Fish and Wildlife Research Unit, WA

David J. Wynn, Fish and Wildlife Research Unit, WA

David J. Wynn, Fish and Wildlife Research Unit, WA

- Recently Completed Projects

Regional Field Office

David J. Wynn, Fish and Wildlife Research Unit, WA

David J. Wynn, Fish and Wildlife Research Unit, WA

APPENDIX

* Principal Contacts

* Listing of Collaborators

* Other Current Projects

* Recently Completed Projects

PRINCIPAL CONTACTS

The following persons will be the principal contacts for their respective agencies or organizations at the time of execution of this MOU. These contacts may be changed at the agencies or organizations discretion upon notice to the other cooperators.

Bureau of Land Management

William A. Kennedy, Staff Leader, Western Fish and Wildlife Staff, Boise
R. Craig Altop, Director LEMA Center
Mark Vinson, Manager Aquatic Ecology Lab, Logan
Marilyn Nickels, Washington, D.C.

Department of Defense, Army National Guard

Col. Marylin Muzny, Environmental Program Directorate, Army National Guard, WA D.C.
Col. Philip Spence, Environmental Program Directorate, Army National Guard, WA D.C.
Col. Robert McGuire, Washington D.C.
Marcus Blood, Hill AFB
John Crane, Environmental Resource Manager, State of Utah Military Department

National Biological Service

John Bissonette, Leader Fish and Wildlife Research Unit, Logan
Thomas C. Edwards, Jr., Asst. Leader Fish and Wildlife Research Unit, GAP

U.S. Forest Service

Jeffrey L. Kershner, USFS Fish and Wildlife Ecology Unit Leader
David S. Winn, USFS National GIS/RS Coordinator, Fish and Wildlife Applications
Evan DeBloois, Washington, D.C.
Jerry Wylie, Ogden, UT

National Park Service

Marty Ott, Salt Lake City, Utah
John Dennis, Washington D.C.

DRAFT
1/1/88

PRINCIPAL POINTS

The following points are intended to provide a summary of the main issues raised in the draft report.

The following points will be the subject of discussion in the main body of the report. These points may be changed or added to as the work progresses. The following points are intended to provide a summary of the main issues raised in the draft report.

1. Introduction

1.1 The purpose of this report is to provide a summary of the main issues raised in the draft report. The following points will be the subject of discussion in the main body of the report. These points may be changed or added to as the work progresses.

2. Background

2.1 The background to this report is the need for a summary of the main issues raised in the draft report. The following points will be the subject of discussion in the main body of the report. These points may be changed or added to as the work progresses.

3. Objectives

3.1 The objectives of this report are to provide a summary of the main issues raised in the draft report. The following points will be the subject of discussion in the main body of the report. These points may be changed or added to as the work progresses.

4. Methodology

4.1 The methodology used in this report is a summary of the main issues raised in the draft report. The following points will be the subject of discussion in the main body of the report. These points may be changed or added to as the work progresses.

5. Results

5.1 The results of this report are a summary of the main issues raised in the draft report. The following points will be the subject of discussion in the main body of the report. These points may be changed or added to as the work progresses.

U.S. Fish and Wildlife Service

Dan Ashe, Washington D.C.

USDA-APHIS

Bobby Acord, APHIS, ADC, Washington D.C.

Richard Curnow, Denver Wildlife Research Center

Frederick F. Knowlton, Project Leader

USDA-Forestry Sciences Laboratory

Ray W. Brown, Project Leader/Reclamation

Jesse A. Logan, Project Leader -Mtn Pine Beetle/Disturbance Ecology

State of Utah Department of Natural Resources

Ted Stewart, Executive Director

Kathleen Clarke, Deputy Director

Utah State University

Brian L. Pitcher, Dean, College of Humanities, Arts and Social Sciences

Joseph A. Chapman, Dean, College of Natural Resources

DRAFT
1992

U.S. Department of Justice
Federal Bureau of Investigation

MEMORANDUM
TO: DIRECTOR, FBI
FROM: SAC, NEW YORK
SUBJECT: [Illegible]

Re New York letter to Bureau dated 1/15/92.
Enclosed for the Bureau are two copies of a letterhead memorandum (LHM) dated and captioned as above.

Very truly yours,
[Illegible Signature]
Special Agent in Charge

Enclosure
1 - Bureau, Dept. of Justice, Room 5600
1 - New York, Dept. of Justice, Room 5600

Listing of Collaborators

Agricultural Experiment Station/Mineral Lease
Alaska Department of Game and Fish
Aldo Leopold Wilderness Research Institute
Arizona Game and Fish Department
Army Construction Engineering Research Laboratory
Bureau of Land Management
Bureau of Land Management Moab District Office
College of Humanities, Arts, and Social Sciences, Utah State University
Cooperative States Research Service
Cooperative States Research Service, Rangeland Resources Research Grant
Dakota Wildlife Trust
Delta Waterfowl Research Foundation
Department of Defense Legacy Program
Department of Defense, National Training Center, Fort Irwin
Department of Defense, Navy
Department of Defense
Department of Defense, National Guard Bureau
Department of Energy
Earthwatch
Eastside Ecosystem Management Assessment Team
Edwards Air Force
Environmental Protection Agency
Fish and Wildlife Service
Forestry Branch
Glen Canyon Environmental Studies Program
Hill Air Force Base
International Association of Fisheries and Wildlife Agencies
Manitoba Model Forest and Manitoba Department of Natural Resources Marine Corps
Logistics Base
Marine Corps Air Ground Combat Center, Twenty Nine Palms
McIntire Stennis
Minerals Management Service
National Biological Service
National Park Service
National Park Service Subsistence Division, Alaska
National Guard Bureau through U.S. Fish and Wildlife Service
National Science Foundation

Naval Air Weapons Station, China Lake
Nellis Air Force Base
North Dakota Game and Fish Department
Oregon State University
Pacific Power
Pacific Northwest Research Station
Pacific Northwest Research Station
Poisonous Plant lab
Rocky Mountain Experiment Station
Shrub Sciences Laboratory
Southern Appalachian Mountains Initiative
State of Utah, Division of Parks and Recreation
State of Utah, Division of State Land and Forestry
State of Utah Mineral Lease Funds
Stream Systems Technology Center
The Nature Conservancy
U.S. Fish and Wildlife Service through NBS
U.S. Bureau of Reclamation
U.S. Geological Survey
U.S. Department of Agriculture (McIntire-Stennis)
U.S. Congress, Office of Technology Assessment
U.S. Army Dugway Proving Grounds
United States Department of Interior
University of Minnesota
University of Puerto Rico, Terrestrial Ecology Division
University of Tennessee
University of Virginia
US Agency of International Development
US Bureau of Mines
US Geological Survey
US Army Topographical Engineering Center
USDA Extension Service
USDA Forest Service Santa Fe National Forest
USDA Forest Service Southwest Forest Experiment Station
USDA Animal, Plant Health Inspection Service, Animal Damage Control
USDA Forest Service, Forest Pest Management
USDA Agricultural Research Service
USDA Forest Service Intermountain Region (UT, ID, CO, NV)
USDA/Cooperative Research Service Sustainable Agriculture Res Education

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7/15/95

USDA Forest Service
USDI Fish and Wildlife Service
USFS Intermountain Research Station
USFS Pacific NW Station
USFS Pacific Southwest Forest and Range Experiment Station, Region 5
Utah Division of Water Resources
Utah Department of Agriculture
Utah Department of Transportation
Utah Division of Wildlife Resources, Central Utah Project
Utah Department of Natural Resources
Utah Division of Sovereign Lands and Forestry
Utah National Guard
Utah Wilderness Association
Utah Division of Wildlife Resources
Utah Department of Public Health
Utah Department of Environmental Quality
Utah State University Extension Service

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Other Current Projects

Evaluation of livestock, vegetation and wildlife responses to rest-rotation, deferred-rotation and season-long grazing systems on Southern Utah forested rangelands

Collaborating Agency(ies): State / Agricultural Experiment Station

Investigators: Brien E. Norton and James E. Bowns

- Objectives:**
- 1) To evaluate system responses to three grazing systems (rest-rotation, deferred-rotation and season-long grazing) in terms of (a) livestock production in mixed grazing of sheep and cattle, and (b) the ecological status of the vegetation.
 - 2) To determine if grazing after deferment within rest-rotation or deferred-rotation grazing systems increases success of seedling establishment.
 - 3) To determine the effect of the presence of sheep and cattle on elk distribution patterns.

Reducing methane emissions from beef cattle herds in range management systems

Collaborating Agency(ies): U.S. Environmental Protection Agency

Investigators: Kenneth C. Olson, Roger E. Banner, Randall D. Wiedmeier

- Objectives:**
- 1) To compare methane emissions from beef cattle grazing seasonal rangelands in native, unimproved conditions to rangeland improved by seeding to improved grass species.
 - 2) To evaluate the influence of grazing intensity on methane emissions of beef cattle grazing irrigated meadow.
 - 3) To evaluate the methane emission response to an alternative management strategy wherein feeder cattle are at slaughter weight by shortly after weaning (10 months of age).

- 4) To develop an estimate of yearly total methane emissions from grazing beef cows.

Grazing livestock nutrition and management to improve production efficiency

Collaborating Agency(ies): State (Agricu. Experiment Station), Utah Dept. of Agriculture,

USU Faculty Research Grants, Utah Mineral Lease Funds

Investigators: Kenneth C. Olson

Objectives: The major objective is to increase the profitability of grazing livestock production through improved forage conversion efficiency to desired livestock responses. Specific objectives include:

- 1) Evaluate the forage production and nutritional-quality profiles of alternative forages on meadows to find those with potential as improved forages.
- 2) Develop livestock management strategies, such as nutrient supplementation, that improve production efficiency from grazed meadows.
- 3) Evaluate grazing management practices for irrigated meadows that optimize livestock nutrition and production.
- 4) Evaluate livestock nutritional responses to various grazing systems on native rangelands to attain an improved understanding of livestock responses to forage conditions created by those grazing systems.

Management of perennial pepperweed in riparian area

Collaborating Agency(ies): U.D.A. (State)

Investigators: G. Allen Rasmussen and Steve Dewey

Objectives: 1) Determine the types of disturbances which could effectively manage perennial pepperweed.

It is desired to obtain a copy of this report and other reports from the following sources:

General Review of the Report and Management of the Project

The following information is being requested from the project manager, Mr. J. H. Smith, and the project sponsor, Mr. A. B. Jones, regarding the project and its management:

1. A copy of the project charter and the project management plan.

2. A copy of the project status report and the project communication plan.

3. A copy of the project budget and the project risk management plan.

4. A copy of the project closure report and the project lessons learned report.

It is requested that the project manager and project sponsor provide the requested information as soon as possible.

The project manager and project sponsor are requested to provide the requested information as soon as possible.

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Management of the Project and the Project Management Plan

The following information is being requested from the project manager, Mr. J. H. Smith, and the project sponsor, Mr. A. B. Jones, regarding the project and its management:

1. A copy of the project charter and the project management plan.

2. A copy of the project status report and the project communication plan.

3. A copy of the project budget and the project risk management plan.

4. A copy of the project closure report and the project lessons learned report.

Improved management options for cattle ranches: coping with risk and federal rangeland policy changes

Collaborating Agency(ies): State / Agricultural Experiment Station

Investigators: John P. Workman

- Objectives:**
- 1) To develop rangeland and ranch management recommendations for Utah ranches.
 - 2) To improve linear programming ranch optimizations by incorporating risk (precipitation, livestock prices, feed costs).
 - 3) To identify and analyze promising options for Utah ranches to survive changes in federal rangeland policy.

Snowmelt erosion from simulated waste burial trench caps

Collaborating Agency(ies): D.O. E.

Investigators: James P. Dobrowolski

- Objectives:**
- 1) Monitor long-term snowfall, snowmelt, and snowmelt erosion.
 - 2) Attempt to establish some basic relationships between simulated and natural snowfall at INEL.
 - 3) Identify differences in melt rates between simulated snow and natural snow under two simulated rainstorms.
 - 4) Monitor subsidence and erosion from the protective biobarrier cover experiment (PBCE).

Effects of disturbance by tracked vehicles on wind and water erosion

Collaborating Agency(ies): USFS Intermountain Research Station

Shrub Sciences Laboratory

Investigators: James P. Dobrowolski

- Objectives:**
- a) To determine the effects of tracked vehicles on the integrity of surface soil crusts, as indexed by wind and water erosion.

Improved management options for cattle ranches using water rights and federal reclamation policy changes

Colorado Agricultural Experiment Station
Fort Collins, Colorado
John R. Williams

Objective: To develop a management plan for cattle ranches in the Colorado River Basin that will improve water use efficiency and reduce the risk of water shortage.

1) To develop a management plan for cattle ranches in the Colorado River Basin that will improve water use efficiency and reduce the risk of water shortage.

2) To develop a management plan for cattle ranches in the Colorado River Basin that will improve water use efficiency and reduce the risk of water shortage.

Summary of results from studies of water rights and ranches

Colorado Agricultural Experiment Station
Fort Collins, Colorado
John R. Williams

Objective: To develop a management plan for cattle ranches in the Colorado River Basin that will improve water use efficiency and reduce the risk of water shortage.

1) To develop a management plan for cattle ranches in the Colorado River Basin that will improve water use efficiency and reduce the risk of water shortage.

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3) To develop a management plan for cattle ranches in the Colorado River Basin that will improve water use efficiency and reduce the risk of water shortage.

Effect of disturbance by tracked vehicles on wind and water erosion

Colorado Agricultural Experiment Station
Fort Collins, Colorado
John R. Williams

Objective: To determine the effect of tracked vehicles on wind and water erosion.

1) To determine the effect of tracked vehicles on wind and water erosion.

- b) To determine the influence of antecedent moisture content on the level of longevity of disturbance.
- c) To quantify the effects of vehicular disturbance on the rate of recovery of undisturbed soil physical properties.

Parameterization of crusting effects on hydraulic conductivity to enhance and validate new water erosion prediction technology

Collaborating Agency(ies): Utah Agricultural Experiment Station

Investigators: James P. Dobrowolski

- Objectives:**
- 1) Utilize regression, multivariate, and other statistical techniques to develop relationships between measured crust characteristics and infiltration.
 - 2) Enhance and validate parameter estimation procedures for the hydrologic component of the rangeland WEPP model by increasing parameter representation of spatial and temporal variability of soil crust properties.
 - 3) Validate the soil crusting/hydraulic conductivity/ infiltration components of the rangeland WEPP model.

Watershed-scale research in the pinyon-juniper ecosystem

Collaborating Agency(ies): Utah Agricultural Experiment Station

Investigators: James P. Dobrowolski and John C. Malechek

- Objectives:**
- 1) To establish a long-term, watershed-scale research site for applied and basic research into the dynamics of a Great Basin pinyon-juniper ecosystem. This effort will involve investigators from across the USU campus and be coordinated with other regional studies at Los Alamos National Laboratory, Oregon State University, and the University of Nevada, Reno. Utah Agricultural Experiment Station funds will be used to delineate the site and to promote the acquisition of development funding from other sources.

10. To determine the influence of sedimentation on the
level of oxygen in the water.

11. To quantify the effect of sedimentation on the rate of
oxygen consumption in the water.

Formulation of criteria for water quality technology to enhance and maintain water quality

Collaborating Agencies: The Agricultural Experiment Station

Investigator: James F. Thompson

1) To determine the relationship between sedimentation and
oxygen consumption in the water.

2) To determine the relationship between sedimentation and
oxygen consumption in the water.

3) To determine the relationship between sedimentation and
oxygen consumption in the water.

77. Water quality criteria in the phytoplankton ecosystem

Collaborating Agencies: The Agricultural Experiment Station

Investigator: James F. Thompson and John C. Mitchell

1) To determine the relationship between sedimentation and
oxygen consumption in the water.

- 2) To perform mechanistic research in pinyon-juniper ecosystem dynamics, e.g., energy, water and nutrient cycling, organismal structure and function at relevant scales, sediment source/sink relationships, etc., while simultaneously addressing the more pragmatic concerns associated with management by objectives, the effects of drastic disturbance, or the results of custodial management.

Diet training: creating options for livestock grazing in the nineties and beyond

Collaborating Agency(ies): CSRS/State

Investigators: Frederick D. Provenza

Objectives: To study how the following factors affect the propensity of ruminants like sheep and goats to ingest foods: (i) learning from mother versus postingestive consequences, (ii) animal age and amount of exposure with mother, (iii) mother's influence versus peer pressure, and (iv) changes in environment.

Assessment of depredation problems in orchard, hay and cereal grain crops

Collaborating Agency(ies): Utah Division of Wildlife Resources, Pittman-Robertson

Investigators: Philip J. Urness and Dennis D. Austin

Livestock grazing as a means to increase shrub survival and growth

Collaborating Agency(ies): Utah Division of Wildlife Resources, Pittman-Robertson

Investigators: Philip J. Urness

Forage preferences of elk and deer among grass cultivars selected for range seedings

Collaborating Agency(ies): Utah Division Wildlife Resources and USDA, ARS
Pittman-Robertson and Federal, ARS

Investigators: Philip J. Urness, T. Jones, Dennis Austin, R. Stevens

It is noted that the present draft of the proposed rulemaking is in the early stages of development and that it is not intended to be a final rulemaking. The rulemaking is intended to be a final rulemaking and will be subject to the usual rulemaking procedures, including the opportunity for public comment and the usual rulemaking procedures.

Final Rulemaking: Proposed Rulemaking for the National and State

The following information is provided for the purpose of providing information to the public. It is not intended to be a final rulemaking and will be subject to the usual rulemaking procedures, including the opportunity for public comment and the usual rulemaking procedures. The following information is provided for the purpose of providing information to the public. It is not intended to be a final rulemaking and will be subject to the usual rulemaking procedures, including the opportunity for public comment and the usual rulemaking procedures.

Development of the National and State Rulemaking

The following information is provided for the purpose of providing information to the public. It is not intended to be a final rulemaking and will be subject to the usual rulemaking procedures, including the opportunity for public comment and the usual rulemaking procedures.

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Development of the National and State Rulemaking

The following information is provided for the purpose of providing information to the public. It is not intended to be a final rulemaking and will be subject to the usual rulemaking procedures, including the opportunity for public comment and the usual rulemaking procedures.

Objectives: To assess relative values of native and exotic-grass species on seeded range used in spring by wild ungulates

Big game management issues - Utah

Collaborating Agency(ies): Utah Division of Wildlife Resources, Pittman-Robertson

Investigators: Philip J. Urness and Dennis D. Austin

Objectives: To address questions regarding big game and habitat management

Seed and seedling ecology of Utah juniper (Juniperus osteosperma)

Collaborating Agency(ies): Utah Agricultural Experiment Station

Investigators: Eugene W. Schupp

Objectives:

- a) Quantify flower and fruit production, fruit availability and seed dispersal.
- b) Determine the identity of the seed dispenser assemblage.
- c) Estimate the spatial pattern of seed dispersal.
- d) Quantify the extent and pattern of post dispersal seed predation.
- e) Quantify germination, seedling establishment and early growth and survival.

Seed production, dispersal and loss as factors limiting recruitment of Cercocarpus ledifolius

Collaborating Agency(ies): State / Vice President for Research

Investigators: Eugene W. Schupp

Objectives:

- a) Quantify fruit initiation and maturation.
- b) Quantify the loss of developing seeds to insect seed predators.
- c) Describe the pattern of seedfall among available microhabitats.
- d) Quantify the extent and microhabitat pattern of postdispersal seed predation.

In order to ensure that the information provided is accurate and reliable, the following information is provided for your information.

High quality management issues - 1/10/02

Collaborative Approach
Investigation
To ensure that the information provided is accurate and reliable, the following information is provided for your information.

Seed and seedling research of fish farming

Collaborative Approach
Investigation
To ensure that the information provided is accurate and reliable, the following information is provided for your information.

- 1) Quantity of seed and seedling research of fish farming
- 2) Quantity of seed and seedling research of fish farming
- 3) Quantity of seed and seedling research of fish farming
- 4) Quantity of seed and seedling research of fish farming
- 5) Quantity of seed and seedling research of fish farming

Seed production, dispersal and loss as factors limiting recruitment of *Carassius auratus*

Collaborative Approach
Investigation
To ensure that the information provided is accurate and reliable, the following information is provided for your information.

- 1) Quantity of seed and seedling research of fish farming
- 2) Quantity of seed and seedling research of fish farming
- 3) Quantity of seed and seedling research of fish farming
- 4) Quantity of seed and seedling research of fish farming
- 5) Quantity of seed and seedling research of fish farming

Cool desert range ecology

Collaborating Agency(ies):

Utah Agricultural Experiment Station

Investigators:

Martyn M. Caldwell

Objectives:

- a) determine mechanisms accounting for competitive abilities and grazing tolerances of prominent plants growing in the sagebrush steppe

Range forage physiology/biochemistry

Collaborating Agency(ies):

USDA-ARS

Investigators:

N. Jerry Chatterton

Objectives:

- a) To define biochemical and physiological limitations of plant growth under cool temperatures. Extend the growing season of forage grasses.
- b) To understand the enzymology and metabolism of starch and fructan biosynthesis in temperate range grasses.
- c) Improve germplasm enhancement by adapting molecular biology techniques including RAPDs and DNA sequencing to the forb and grass breeding efforts.
- d) To integrate in vitro assimilate partitioning information into the complex whole plant system and facilitate improved germplasm enhancement.

Range forage physiology

Collaborating Agency(ies):

USDA/ARS

Investigators:

Douglas A. Johnson

Objectives:

- a) define physiological basis of plant resistance to environmental and biological stresses
- b) develop practical selection techniques and indices for screening grass and legume populations
- c) determine nodulation and N-fixing capabilities of promising range legumes and determine the effects of environmental stress on these processes.

Coal-based energy ecology

Collaborative Agreement
Investigator
Objectives
1. Develop a research program to investigate the ecological effects of coal-based energy production on the environment.
2. Develop a research program to investigate the ecological effects of coal-based energy production on the environment.

Range forgo physiological/biochemistry

Collaborative Agreement
Investigator
Objectives
1. To determine the physiological and biochemical effects of range forgo on the growth and development of the plant.
2. To determine the physiological and biochemical effects of range forgo on the growth and development of the plant.
3. To determine the physiological and biochemical effects of range forgo on the growth and development of the plant.
4. To determine the physiological and biochemical effects of range forgo on the growth and development of the plant.

Range forgo physiology

Collaborative Agreement
Investigator
Objectives
1. To determine the physiological effects of range forgo on the growth and development of the plant.
2. To determine the physiological effects of range forgo on the growth and development of the plant.
3. To determine the physiological effects of range forgo on the growth and development of the plant.

Enhanced UV-B: ecological affects of altered secondary chemistry and morphology and plant action spectra to link stratosphere ozone reduction with biosphere responses

Collaborating Agency(ies): U.S.D.A.

Investigators: Martyn M. Caldwell

- Objectives:**
- a) To develop ultraviolet action spectra for plant responses.
 - b) To test and modify action spectra under polychromatic radiation conditions in growth chamber and field experiments.

Range grass breeding and cytogenetics

Collaborating Agency(ies): USDA/ARS

Investigators: K.B. Jensen, USDA/ARS

- Objectives:**
- a) acquire germplasm of perennial Triticeae and describe their cytogenetic and reproductive characteristics
 - b) define phylogenetic relationships among perennial Triticeae and construct a taxonomic classification.
 - c) advance induced autopoloid and amphidiploid populations of promising species and hybrids to the point of usefulness to grass breeders.
 - d) develop improved germplasm and cultivars of crested wheatgrass, Russian wildrye, Altai wildrye, and interspecific hybrids of Triticeae grasses.
 - e) evaluate new plant materials in terms of establishment vigor, resistance to pests, and environmental stress.

Grass and legume breeding

Collaborating Agency(ies): USDA/ARS

Investigators: K.H. Asay

- Objectives:**
- a) Develop improved germplasm and cultivars of crested wheatgrass for low-maintenance turf, interspecific grass hybrids for saline and limited irrigation, and legumes for dryland grazing and hay production.
 - b) Develop more effective breeding procedures and selection criteria to develop improved grasses and legumes.
 - c) Expand the genetic base in plant breeding programs through plant exploration.

Enhanced IV-5: ecological effects of altered secondary chemistry
and morphology and plant action spectra
to that structure cause reduction with different responses

- Collaborating Agency: U.S.D.A.
Investigator: Nancy M. Caldwell
- a) To develop alternative action spectra for plant response
 - b) To test and modify action spectra under performance response
 - c) To determine a general structure and plant response

Energy input and response

- Collaborating Agency: U.S.D.A.
Investigator: E. E. Caldwell
- a) measure response of photosynthesis and growth rate
response and reproductive response
 - b) define response to various energy inputs (light and heat)
response to various energy inputs
 - c) determine response to light and heat inputs
response and growth of the plant to various energy inputs
 - d) define response to light and heat inputs
response to light and heat inputs and response to light and heat inputs
 - e) determine response to light and heat inputs
response to light and heat inputs and response to light and heat inputs

Energy and response

- Collaborating Agency: U.S.D.A.
Investigator: E. E. Caldwell
- a) measure response to light and heat inputs
response to light and heat inputs and response to light and heat inputs
 - b) define response to light and heat inputs
response to light and heat inputs and response to light and heat inputs
 - c) determine response to light and heat inputs
response to light and heat inputs and response to light and heat inputs

Cytogenetics and enhancement of range forage germplasm

Collaborating Agency(ies): USDA/ARS

Investigators: R. Wang, USDA, ARS

Objectives:

- a) expand hybridization limits of Triticeae
- b) identify and isolate cytogenetic stocks for gene mapping
- c) apply newly developed genetic engineering techniques to range forages

Native range grass breeding

Collaborating Agency(ies): USDA/ARS

Investigators: Thomas A. Jones, USDA/ARS

Objectives:

- a) develop improved germplasm and cultivars of native, cool-season grasses
- b) improve seed germination, seedling establishment, and mature plant drought tolerance, nutritive value, forage and seed yields and resistance to pests.

Larkspur poisoning of cattle on mountain rangelands

Collaborating Agency(ies): USDA/ARS

Investigators: M.H. Ralphs, J. Pfister, G. Manners, D. Stegelmeier, C. Gardner & K. Panter USDA/ARS

Objectives:

- a) determine when, how much, and why cattle eat larkspur
- b) determine if conditioned food aversion or other behavioral modifications can reduce consumption by grazing animals
- c) evaluate new herbicides for larkspur control
- d) evaluate sheep grazing to reduce larkspur availability to cattle
- e) measure alkaloid concentration of larkspur populations and to determine influence on site and environmental factors and predict toxicity of larkspur populations
- f) evaluate mineral supplementation as a means to reduce larkspur consumption by livestock
- g) devise management strategies to reduce losses

Locoweed research

Collaborating Agency(ies):

USDA/ARS/Poisonous Plant Lab

Investigators:

M.H. Ralphs, J. Pfister, L. James, USDA/ARS

Objectives:

- a) determine if livestock poisoned on locoweed can ever be returned to a productive capacity: habitation, impaired prehension of feed, reproduction.
- b) evaluate grazing behavior of livestock with respect to locoweeds to determine which parts are palatable, under what conditions they are eaten, and how much is required to cause intoxication
- c) evaluate quantitative behavioral measures of animal intoxication

Pine needle toxicity in livestock

Collaborating Agency(ies):

USDA/ARS

Investigators:

J. Pfister, R. Weidmeier, D. Adams, USDA/ARS

Objectives:

- a) determine the nutritional impact of pine needles and chemical fractions of needles on rumen microbial populations and digestion dynamics in vivo and in vitro.
- b) determine the amount and timing of pine needle consumption by grazing cows under various environmental conditions.

Behavioral toxicology of livestock ingesting plant toxins

Collaborating Agency(ies):

USDA/ARS

Investigators:J. Pfister, B. Stegelmeier, C. Cheney, F. Provenza,
C. Arave**Objectives:**

- (a) to evaluate the use of behavioral techniques such as operant analysis to measure and predict acute and chronic toxicity.
- (b) to use behavioral techniques to relate levels of plant toxins and palatability of plants to livestock.

Endocrine Research

- Coordinating Agency: *USDA/ARS*
Investigator: *Dr. R. L. Soto*
Objective: *to determine the effect of endocrine disruptors on the reproductive system of livestock, including the effect of these agents on the development of the reproductive system.*
- a) to determine the effect of endocrine disruptors on the reproductive system of livestock, including the effect of these agents on the development of the reproductive system.*
- b) to determine the effect of endocrine disruptors on the reproductive system of livestock, including the effect of these agents on the development of the reproductive system.*
- c) to determine the effect of endocrine disruptors on the reproductive system of livestock, including the effect of these agents on the development of the reproductive system.*

Plant Toxicity in Livestock

- Coordinating Agency: *USDA/ARS*
Investigator: *Dr. R. L. Soto*
Objective: *to determine the effect of plant toxins on the reproductive system of livestock, including the effect of these agents on the development of the reproductive system.*
- a) to determine the effect of plant toxins on the reproductive system of livestock, including the effect of these agents on the development of the reproductive system.*
- b) to determine the effect of plant toxins on the reproductive system of livestock, including the effect of these agents on the development of the reproductive system.*
- c) to determine the effect of plant toxins on the reproductive system of livestock, including the effect of these agents on the development of the reproductive system.*

Behavioral Toxicology of Livestock Ingesting Plant Toxins

- Coordinating Agency: *USDA/ARS*
Investigator: *Dr. R. L. Soto*
Objective: *to determine the effect of plant toxins on the behavior of livestock, including the effect of these agents on the development of the reproductive system.*
- a) to determine the effect of plant toxins on the behavior of livestock, including the effect of these agents on the development of the reproductive system.*
- b) to determine the effect of plant toxins on the behavior of livestock, including the effect of these agents on the development of the reproductive system.*
- c) to determine the effect of plant toxins on the behavior of livestock, including the effect of these agents on the development of the reproductive system.*

Toxicity of purified larkspur alkaloids

Collaborating Agency(ies):

USDA/ARS

Investigators:

J. Madl, J. Walrond, J. Pfister, G. Manners, K. Panter,
USDA/ARS.

Objectives:

- (a) to determine the mechanism of toxicity of crude alkaloidal extracts and purified larkspur alkaloids on neuromuscular transmission.
- (b) to develop monoclonal antibody techniques for the detection and quantification of toxic alkaloids in plant and animal tissues and fluid.
- (c) evaluate cholinergic drugs and drug delivery systems for efficacy in reversing larkspur toxicity.

Stability of plant community composition and yield in sagebrush steppe relicts

Collaborating Agency(ies):

CSRS Special Rangeland Resources Grant

Investigators:

Neil E. West, G. Allen Rasmussen

Objectives:

- 1) Determine total, between growth form and species composition by mid-summer yields of aboveground phytomass for 17 previously monitored relict stands of sagebrush steppe (Passey et al. 1982. USDA SCS Tech, Bull. No. 1669) and determine whether the plant communities of the 1990s at this set of sites are similar or different in the 1960's.
- 2) Implement additional, less destructive and statistically adequate means of monitoring previous and additional characteristics of vegetation and soils at these sites into the future.
- 3) Use the results of earlier and later studies of these sites to modify range condition and trend interpretations, if necessary.
- 4) Use the results of earlier and later studies of these sites for extension training programs directed to personnel in public and private land management and interested environmental groups dealing with principles of vegetation dynamics and rangeland monitoring.

Development of new approaches to rangeland monitoring and the assessment of condition and trend

Collaborating Agency(ies):

State/Agricultural Experiment Station

Investigators:

Neil E. West and G. Allen Rasmussen

Objectives:

- a) testing of an ordination approach for separating the effects of climatic fluctuations from other influences on vegetation change in semiarid environments.
- b) to relate the abundance of coppice mounds and other microtopographic and edaphic features to changes in vegetation and land use history.
- c) to test the applicability of the piosphere concept to placement of monitoring stations
- d) to demonstrate to land management agency personnel, ranchers and environmentalists how monitoring can be accomplished using new concepts and methods.

Rangeland monitoring at Cutler Reservoir

Collaborating Agency(ies):

Pacific Power

Investigators:

G. Allen Rasmussen

Objectives:

- a) Develop a monitoring program which will determine if multiple management objectives (watershed, livestock, wildlife and recreation) are being obtained.
- b) Look at the economic differences between monitoring protocols for monitoring multiple objectives.

Population dynamics of the Mountain Pine Beetle (INT-4501)

Collaborating Agency(ies):

USDA/Forest Service

Investigators:

Dale L. Bartos

Objectives:

- a) Study the dynamics of mountain pine beetle in the lodgepole pine system.
- b) Utilize GIS, Expert Systems, and Simulation Models to study the mountain pine beetle ecosystem.
- c) Study the interaction of mountain pine beetle, lodgepole pine, aspen, and Armillaria root rot.

Development of new approaches to research monitoring and the assessment of condition and trend

Collaborative Agreement
Investigator: Paul E. West and G. Allan Edwards

- Objectives:
1. To develop a methodology for the assessment of the effects of disturbance on vegetation from either historical or contemporary data in natural environments.
 2. To assess the feasibility of applying remote sensing and other microtopographic and climatic factors to changes in vegetation and land use history.
 3. To test the applicability of the proposed concept to the assessment of vegetation changes.
 4. To determine if the proposed concept is applicable to natural and semi-natural areas and if it can be applied to the assessment of vegetation changes.

Research monitoring at Cedar River

Collaborative Agreement
Investigator: Paul E. West and G. Allan Edwards

- Objectives:
1. To develop a methodology for the assessment of the effects of disturbance on vegetation from either historical or contemporary data in natural environments.
 2. To assess the feasibility of applying remote sensing and other microtopographic and climatic factors to changes in vegetation and land use history.
 3. To test the applicability of the proposed concept to the assessment of vegetation changes.
 4. To determine if the proposed concept is applicable to natural and semi-natural areas and if it can be applied to the assessment of vegetation changes.

Population dynamics of the Mountain Pine Beetle (1971-1981)

Collaborative Agreement
Investigator: Paul E. West and G. Allan Edwards

- Objectives:
1. To develop a methodology for the assessment of the effects of disturbance on vegetation from either historical or contemporary data in natural environments.
 2. To assess the feasibility of applying remote sensing and other microtopographic and climatic factors to changes in vegetation and land use history.
 3. To test the applicability of the proposed concept to the assessment of vegetation changes.
 4. To determine if the proposed concept is applicable to natural and semi-natural areas and if it can be applied to the assessment of vegetation changes.

Western integrated ranch/farm education (W.I.R.E.)

- Collaborating Agency(ies):** USDA/CRS Sustainable Agriculture Research and Education
- Investigators:** J. Hewlett (UW), G. Gade (UW), J. Jenkins (UW), K. Drake (UW), J. Lacey, (MSU), R. Banner (USU).
- Objectives:**
- 1) To teach ranchers/farmers a process of integrated management-strategic planning, tactical planning, implementation, monitoring, replanning-in three western states: Wyoming, Montana, and Utah.
 - 2) To develop in-depth follow-up training in specific resource areas to meet needs identified by program participants.
 - 3) To evaluate the program in terms of adoption of management concepts and resource sustainability following implementation of the WIRE process by selected cooperators.

Four-Corners Navajo Nation sustainable agriculture demonstration project

- Collaborating Agency(ies):** USDA/CSRS Sustainable Agriculture Research and Education
- Investigators:** L.G. McNeal, R.E. Banner, P. Gutierrez (CSU), K. Farrell-Poe, S. Poe, R. Smith (CSU), W. Varga, K. Williams (CSU).
- Objectives:**
- 1) To develop and sustain improved socio-economic conditions for Navajo agro-pastoralists while maintaining cultural integrity through preservation of the traditional "Navajo Lifeway".
 - 2) To develop integrated systems to maximize output from Navajo agro-pastoral production practices while minimizing negative environmental impacts, which include soils, plant, energy, waste management and water quality considerations.
 - 3) To develop a trans-disciplinary whole-farm systems model for sustainable Navajo rural economic development. The process would incorporate a two-way cross-cultural transfer of agro-pastoral technologies.
 - 4) To provide on-site monitoring by a trained Navajo, develop entrepreneurial skills and cultivate leadership proficiency among Navajo cooperator participants.
 - 5) To establish a Four-Corners Sustainable Agriculture and Natural Resources Advisory Council, made up of participants representing

elected officials, federal and state government agencies, Land Grany Universities, private enterprise and other appropriate organizations representing the states of Arizona, Utah, New Mexico and Colorado and the numerous Native American reservations that encompass the Four-Corners region.

Identifying NIPF owner attitudes and information needs about ecosystem management

Collaborating Agency(ies): USDA Extension Service

Investigators: M.R. Kuhns, M.W. Brunson, S.D. Roberts (Purdue)

Objectives:

- 1) Describe current state of knowledge and beliefs of Utah and Indiana private forest owners (who are mostly farm/ranch operators) about ecosystem management of their forested lands.
- 2) Describe forest owners' concerns and information needs concerning ecosystem management, especially with regard to public-private partnership efforts.
- 3) Compare attitudes of Utah's forest owners with those of NIPF owners in Midwestern and Southeastern states where forest products are more important economically.

Recently Completed Projects

Field evaluation of rifle and shotgun inoculum for inoculating trees with decay fungi. Baker, F.A., S.E. Daniels, and C. Parks. USDA Forest Service

Evaluation of rifles and shotguns for inoculating trees with decay fungi. Baker, F.A., S.E. Daniels, and C. Parks. USDA Forest Service, Oregon State University

Demonstration of a root disease sampling technique. Baker, F.A. USDA Forest Service

Predicting the hazard of annosus root disease in eastside pine stands using ecological types. Baker, F.A., DeNitto, G. USDA Forest Service, Forest Pest Management

Optimal spacing of transects for sampling dwarf mistletoe in jack pine stands. Baker, F.A. Manitoba Model Forest and Manitoba Department of Natural Resources Forestry Branch

Visualization and analysis of tree data in non-uniform forest stands. W.D. Hoskins, J.A. Hoskins, and F.A. Baker. University of Manitoba and Manitoba Department of Natural Resources Forestry Branch

Quantification of root disease in forest stands. Baker, F.A. Earthwatch

Mountain pine beetle response to traps baited with selected pheromones and kairomones in old versus new portions of an infestation in a lodgepole pine forest. Baker, F.A. USDA Forest Service

Preliminary study of the dynamics of endemic mountain pine beetles in lodgepole pine/aspen ecosystems. Baker, F.A. USDA Forest Service

Evaluation of sampling technique used for detecting root disease in the Forest Health Monitoring Program. Baker, F.A. USDA Forest Service

Evaluation of stand based sampling for quantification of root disease in eastside pine and mixed conifer stands and the development of a root disease hazard rating system. Baker, F.A., DeNitto, G. USDA Forest Service, An evaluation of the incidence of root disease caused by Heterobasidion annosum and other root pathogens in an undisturbed Douglas-fir and grand fir stand. Baker, F.A. USDA Forest Service.

Assessing the Social Aspects of Ecosystem Management in the Northern Rocky Mountains, Mark W. Brunson; USDA Forest Service; Pacific Northwest Research Station; completed September 1994

Attitudes toward Public Lands Issues in the West; Brent Steel, Nicholas Lovrich, Mark Brunson, Bruce Shindler; Eastside Ecosystem Management Assessment Team; completed September 1994

Effects of Information and Post-Harvest Recovery Time on Perceived Scenic Quality of Managed Forest Stands; Mark W. Brunson; State of Utah (Mineral Lease); completed June 1994

The "Social Acceptability" Component of Ecosystem Management: Synthesis and Problem Analysis; Mark W. Brunson; USDA Forest Service, Pacific Northwest Research Station; completed September 1993

Social Acceptability of "New Perspectives" Practices and Conditions; George Stankey, Mark W. Brunson; USDA Forest Service, Pacific Northwest Research Station; completed September 1992

Mountain Biking, Tourism, and Regional Development in Southeastern Utah; Dale J. Blahna; State of Utah (Mineral Lease Funds)

Statewide Survey of Utah Residents' Attitudes on State Park Management and Policy Issues; Janet A. Anderson, Dale J. Blahna; State of Utah, Division of Parks and Recreation

Challenge Cost Share Proposal for the Development of Map and Trail Signs for the Pecos Wilderness Area; Dale J. Blahna; U.S.D.A. Forest Service, Santa Fe National Forest

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